

LOWER COLUMBIA — GRAYS COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Grays coastal cutthroat are classified as a distinct stock complex based on the geographic distribution of their spawning grounds. Grays River enters the Columbia River at RM 21.

Anadromous, resident and fluvial life history forms distribute themselves throughout the watershed. The anadromous form has access to most of the watershed with the exception of upper tributary reaches, where a combination of steep gradient and high flow can limit passage. The resident forms have been observed throughout the system.

As with other wild Columbia River coastal cutthroat, entry to the Columbia River commences in July and continues through the fall. The data on Grays River anadromous cutthroat are limited, but we believe that the timing of river entry and spawning is similar to that of Elochoman fish which enter the river from late July through Mid-April, with peak entry in the fall and spawning from January through April. Fluvial and resident spawning times have not been documented in this watershed but are believed to be similar to the anadromous spawning time. Size, age, coloration, and genetic data are unavailable for this stock, however, we believe that this information would be similar to that for other Columbia River stocks. Anadromous cutthroat life history data are available for the Kalama, Toutle, and Cowlitz rivers (Hulett 1995; Loch 1982; Loch and Downing 1990; Loch and Pahutski 1991, 1992; Loch and Byrd 1993; Tipping and Springer 1980; Tipping 1982).

The genetic relationship of the Grays stock complex to other stocks and stock complexes is unknown. Genetic sampling and analysis are needed to make this determination, however no sampling has been done.

Grays coastal cutthroat trout are native and are sustained by wild production. There is no record of hatchery cutthroat releases into this drainage.

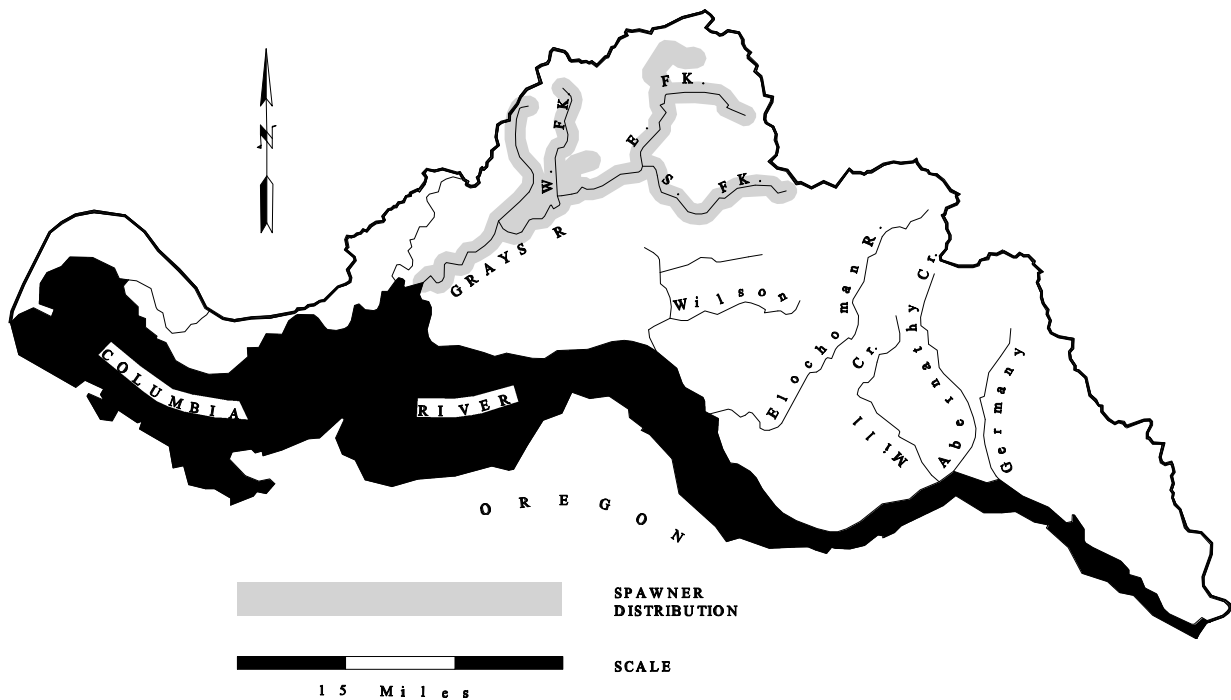
STOCK STATUS

The status of the Grays stock is Depressed based on a long-term decline in the Columbia River recreational catch estimates from RM 0 to RM 38. These sport catch data were collected during a survey conducted from 1972 to 1995 to estimate salmon and steelhead catch, but cutthroat trout were also recorded. No distinctions among life history forms were made, but the numbers probably represent mainly anadromous and fluvial fish. Data quality from the survey is fair. Because the survey targeted salmon and steelhead, changes in angling effort for cutthroat cannot be quantified. Some

STOCK DEFINITION PROFILE for Grays Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - UNKNOWN



TIMING

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													No
Anad Spawning													No

Timings are unknown. These timings are based on those of the Elochoman stock complex.

BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

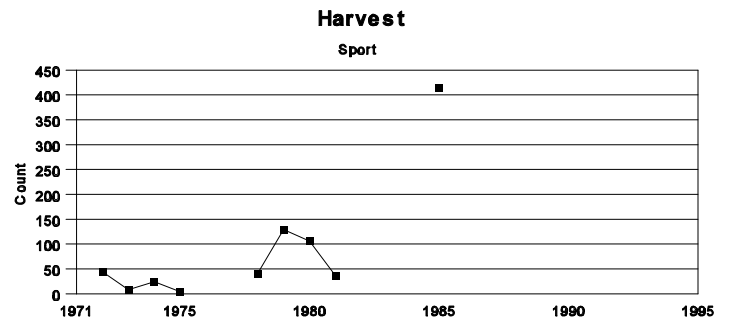
STOCK STATUS PROFILE for Grays Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> Fair

Return Years	HARVEST Sport			
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1971	
1972	44
1973	8
1974	24
1975	4
1976	0
1977	0
1978	41
1979	129
1980	106
1981	36
1982	0
1983	0
1984	0
1985	416
1986	0
1987	0
1988	0
1989	0
1990	0
1991	0
1992	0
1993	0
1994	0
1995	0



AVERAGE RUNSIZE DISTRIBUTION

No data available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Depressed

Screening Criteria

Long-Term negative trend

sampling inconsistencies were apparent in the early to mid-1970s, and in some years sampling was incomplete. More restrictive angling regulations, implemented during the survey, also appear to have reduced cutthroat catch, but the extent of this reduction has not been determined.

The catch between 1971 and 1991 was composed of both hatchery and wild fish. Small samples from this fishery were collected between 1979 and 1982. Tipping (1982) found that 20% of the catch was wild ($n = 31$). Sampling in 1979 and 1980 indicated that 50% of the catch was wild. Columbia River estuary sampling in 1981 indicated that 21% of the sample ($n = 141$) was wild (Loch 1982). Columbia River catch data suggest a decline in cutthroat abundance over time.

There are no population-size data, only distribution data, for resident Grays River cutthroat, so the status of this life history form cannot be assessed. WDF et al. (1993) characterized Grays River chum, coho, and winter steelhead as Depressed. Severe habitat degradation had occurred and was identified as one of the key factors limiting wild production. Since resident coastal cutthroat have similar freshwater habitat requirements as anadromous cutthroat, coho, and winter steelhead, we believe that their status is also depressed.

FACTORS AFFECTING PRODUCTION

Habitat--The coastal cutthroat trout's extended freshwater residency and the anadromous form's near-shore migratory patterns require specific and varied freshwater and estuarine habitat types. The Grays River ecosystem has been degraded by past and present human activities that have reduced the habitat quality, quantity, and complexity. The primary land-use activities responsible for these include road building, timber harvesting, agriculture, and rural development. These upslope and riparian activities have increased sediment, reduced woody debris availability and recruitment, increased water temperatures, changed runoff patterns, and reduced river flow.

Most land in this watershed is managed for timber production. Logging in the riparian zone has produced riparian habitat which is simple and in early successional stages. As a result, summer water temperatures are elevated, and large woody debris is lacking. Increases in fine sediment in streams have decreased survival of trout eggs and alevins, reduced stream productivity and ultimately food availability, and decreased the size and depth of pools which are important as rearing and adult holding areas for cutthroat trout. Large pools (> 50 sq yds and > 6 ft deep) have been reduced by 69% on the Grays River since 1945 (USFS et al. 1993). Increases in large woody debris would increase fish productivity by forming and maintaining pools, providing fish cover, and trapping spawning gravel.

Grays River anadromous cutthroat use the Columbia River estuary primarily during the late winter, spring, and summer. It is estimated that the tidelands, swamps, and wetlands in the

Columbia River estuary were reduced by 40% from 1870 to 1970 (Sherwood et al. 1990). The recent changes in ocean current patterns, such as El Niño, have reduced smolt-to-adult survival of all Columbia River salmonids. Smolt-to-adult survival of hatchery anadromous cutthroat released in the Columbia Basin has decreased since the 1980s (Byrnes 1995; Tipping 1995). Reduction in estuarine habitat and poor near-shore ocean conditions have contributed to the decline of anadromous cutthroat trout.

Harvest Management--There is no directed commercial harvest of coastal cutthroat trout although small numbers have been caught in the lower Columbia River gillnet fishery. Angler harvest of wild coastal cutthroat was high but has tapered off dramatically as sportfishing regulations have become more restrictive. Tributaries are closed to protect spawning adults. A twelve-inch minimum size in mainstem streams was adopted in 1985 to permit most females to spawn at least once. A wild cutthroat release regulation was adopted in 1992, limiting harvest to hatchery fish. In 1992 the minimum size was increased to 14 inches, and in 1994 the mainstem Grays River was closed to fishing for trout (except steelhead). In addition, juvenile protection occurs in the form of stream closures to protect smolts from March 15 to May 31. In 1994 a two-trout daily limit with an eight-inch minimum size limit was adopted for tributaries to protect resident cutthroat. Since wild cutthroat harvest is prohibited in mainstems and limited in tributaries, directed harvest is very low. Wild mortality is unknown but believed to be low from both hooking mortality and illegal harvest.

Hatchery--Grays River Hatchery is located at RM 1 on the West Fork Grays River. It was constructed in the late 1950s under the Mitchell Act to mitigate for the anadromous fish losses caused by the construction and operation of mainstem hydroelectric dams on the Columbia River. It raises coho and fall chinook and has raised chum salmon. About 28,000 hatchery steelhead smolts are released annually into the Grays River from Beaver Creek Hatchery. Ecological impacts to wild coastal cutthroat from hatchery salmon and steelhead releases are unknown.

Other Factors--Marine mammal populations along the west coast including the Columbia River have increased since they continue to be protected under the federal Marine Mammal Protection Act of 1976. Current population estimates are approximately 300-500 sea lions and numbers exceeding 3,000 harbor seals in the Columbia River (NOAA 1997). As these populations have increased, so has their food and fish consumption. Both sea lions and seals are most abundant from late winter through spring and can intercept both anadromous cutthroat smolts and kelts as they move toward the estuary. Anadromous cutthroat adults returning to Beaver Creek Hatchery were examined for marine mammal marks; the percentage of returning adults with marks ranged from 0% to 16% and averaged 7% since 1982. Estimates of cutthroat predation by marine mammals have not been made, but the marine mammal mark rate indicates that in some years it may be high.

LOWER COLUMBIA — ELOCHOMAN/SKAMOKAWA CREEK **COASTAL CUTTHROAT**

STOCK DEFINITION AND ORIGIN

Elochoman/Skamokawa Creek coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds. Cutthroat in this stock spawn in the Elochoman River and Skamokawa Creek. Both drainages originate in the Willapa Hills and flow in a generally southwest direction through Wahkiakum County and empty into the Columbia River at RM 38 and RM 33, respectively. Because of their close proximity, small size, and similar drainage characteristics, and the limited biological data available, fish in these two drainages have been combined in a single stock complex.

The Elochoman/Skamokawa cutthroat complex is represented by genetic samples from the Beaver Creek Hatchery. Analysis showed that it was not significantly different from the Cowlitz stock complex. However, it was found to be genetically different from collections from the Kalama and Lewis rivers.

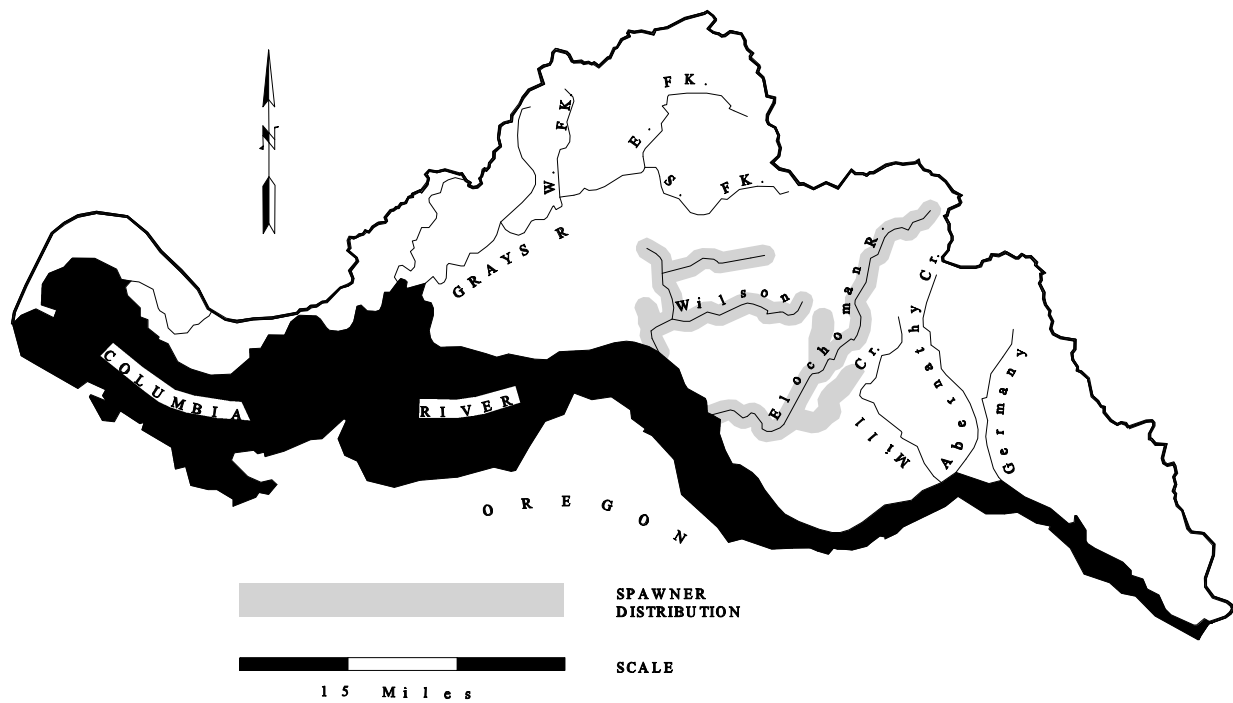
Anadromous, resident and fluvial forms distribute themselves throughout these watersheds. Anadromous cutthroat trout have access to most of the Elochoman watershed with the exception of Beaver Creek, where a WDFW weir blocks fish passage to maintain water quality for the hatchery; Duck Creek where a falls blocks entry; and upper tributary reaches where a combination of steep gradient and high flow can limit passage. Anadromous fish have access to all Skamokawa tributaries with the possible exception of upper stream reaches where high gradient and flows may limit passage. The resident forms have been observed throughout the system.

As with other wild Columbia River anadromolus stocks, entry into the Columbia River commences in July and continues through the fall. Entry into Beaver Creek, an Elochoman River tributary, is from August through March (Lucas 1980). Peak trapping for wild anadromous cutthroat usually occurs from October through January depending on river conditions. Spawning can occur from late December through early June (Lavier 1959), however, in most years spawning activity occurs from January through April (WDFW, unpublished data). The anadromous spawn timing was determined from fish returning to the Beaver Creek Hatchery, located on the Elochoman River, during years of initial anadromous cutthroat brook stock collection. Artificial selection for early spawning time now has hatchery cutthroat spawning from December to February (Byrne 1995). Fluvial and resident spawning times have not been documented in this watershed but are believed to be similar to the wild anadromous spawning time. Size, age, coloration and genetic data are unavailable for this stock, however, we believe that this information would be similar to that for other Columbia River stocks. Anadromous cutthroat trout life history data are available for the Kalama, Toutle, and Cowlitz rivers

STOCK DEFINITION PROFILE for Elochoman/Skamokawa Creek Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - UNKNOWN

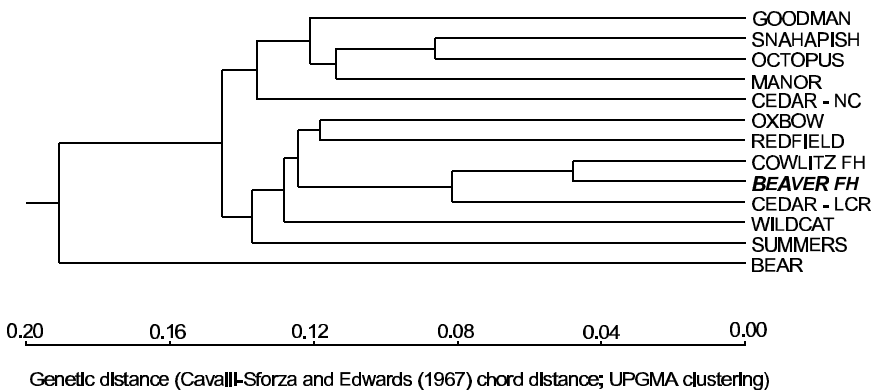


<u>TIMING</u>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													No
Anad Spawning													No

BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

GENETICS - The Beaver Cr. collection (N=99), made in 1995, was significantly different from the Kalama and Lewis collections (33 allozyme-locus G-tests; $P<0.001$) but not significantly different from the Cowlitz Hatchery collection (33 allozyme-locus G-tests; $P>0.05$).

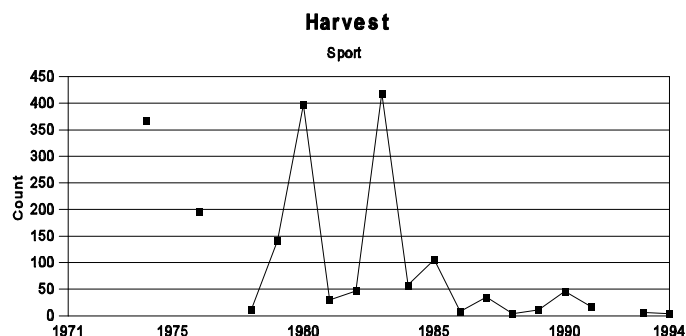
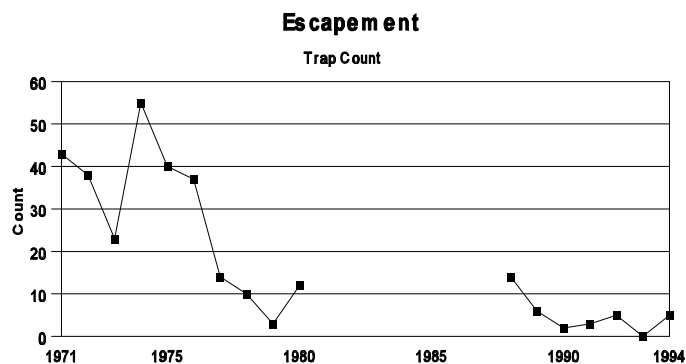


STOCK STATUS PROFILE for Elochoman/Skamokawa Creek Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> Fair

Return Years	ESCAPE Trap count	HARVEST Sport	SURVIVAL Smolt/adult	ESCAPE Hat&Nat
1971	43		1	292
1972	38	0	0	98
1973	23	0	0	37
1974	55	368	0	56
1975	40	0		41
1976	37	196		37
1977	14	0		14
1978	10	11		10
1979	3	141		3
1980	12	397	0	50
1981		30	1	928
1982		47	3	1,945
1983		419	5	1,789
1984		58	3	1,020
1985		106	2	726
1986		8	1	637
1987		35	3	929
1988	14	4	1	493
1989	6	11	1	788
1990	2	46	1	282
1991	3	17	2	558
1992	5	0	0	128
1993	0	6	0	49
1994	5	4	1	319



AVERAGE RUNSIZE DISTRIBUTION

No data available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Depressed

Screening Criteria

Chronically low; LT neg trend

(Hulett 1995; Loch 1982; Loch and Downing 1990; Loch and Pahutski 1991 and 1992; Loch and Byrd 1993; Tipping and Springer 1980; and Tipping 1982). Elochoman/Skamokawa Creek coastal cutthroat trout are considered native and are sustained by wild production. It is not known to what degree, if any, hatchery cutthroat have impacted native fish.

STOCK STATUS

The status of the Elochoman/Skamokawa Creek stock is Depressed based on chronically low counts at the Elochoman and Beaver Creek hatcheries and a long-term decline in the Columbia River cutthroat catch from RM 48 to the mouth. Data quality used to make this assessment is fair. Wild anadromous escapement, measured at the Elochoman River Hatchery, has ranged between 10 and 20 sea-run cutthroat trout annually for the last eight years (Dick Aksamit, WDFW, personal communication). The majority of these are wild or unmarked fish. The trap is operated from September through December to capture coho salmon. The efficiency of this trap for cutthroat trout is unknown.

Most of the data in the Stock Assessment section of the Stock Status Profile were taken from Beaver Creek Hatchery records. Although the data are remarkably complete, they were not collected to assess stock status reports and their usefulness in this regard is unknown.

Trap counts of unmarked adult (wild) anadromous cutthroat from the upper and lower traps at Beaver Creek Hatchery are available from 1958 to 1995. This information is presented in column 1 of the Stock Assessment section of the Stock Status Profile in this report and is the best data type to evaluate wild cutthroat status. These data would be deemed excellent if the marking program for hatchery fish were evaluated to determine the quality of the mark, the duration of mark visibility, and the accuracy of the individual responsible for reading the marks. Currently, the data quality is considered fair. There is also a question regarding the efficiency of the two traps for capturing fish and its variability across years.

What is clear from the data is that before hatchery anadromous cutthroat were introduced, 108 and 75 native cutthroat were captured in 1958-59 and 1959-60, respectively in Beaver Creek. Unmarked returns from 1965 to 1970 averaged over 1,000 adults. It is likely that some of these fish were unmarked hatchery fish, offspring of hatchery fish spawning in the wild, and offspring of wild fish. By 1971 the numbers of unmarked fish had been reduced to 43, and by 1980 the return was only 12 fish. After disease outbreaks at the hatchery in the early 1980s, adult cutthroat were not passed above the Beaver Creek traps in order to maintain water quality at the hatchery. By 1990 all smolts released were adipose-fin clipped, and since that time the annual number of unmarked fish returning to the trap has been no more than five and has averaged three fish.

Column 4 in the Stock Assessment section of the Stock Status Profile in this report represents total returns of cutthroat to the hatchery and column 3 is the smolt-to-adult survival for hatchery cutthroat smolts based on return year. In recent years both these measures have also been low.

Columbia River cutthroat sport catch data collected from 1972 to 1995 during a survey conducted to estimate salmon and steelhead catch are also available. Data quality from the survey is fair. Because the survey targeted salmon and steelhead, changes in angling effort for cutthroat cannot be quantified. Some sampling inconsistencies were apparent in the early to mid-1970s, and in some years sampling was incomplete. More restrictive angling regulations, implemented during the survey, also appear to have reduced cutthroat catch, but the extent of this reduction has not been determined.

The catch between 1971 and 1991 was composed of both hatchery and wild fish. Small samples from this fishery were collected between 1979 and 1982. Tipping (1982) found that 20% of the catch was wild (n=31). Sampling in 1979 and 1980 indicated that 50% of the catch was wild. Columbia River estuary sampling in 1981 indicated that 21% of the sample (n=141) was wild (Loch 1982). The catch data suggest a decline in cutthroat abundance over time.

There are no population-size data, only distribution data, for resident Elochoman/Skamokawa Creek cutthroat, so the status of this life history form cannot be assessed. WDF et al. (1993) characterized the Elochoman River and Skamokawa Creek coho and winter steelhead stocks as depressed. Severe habitat degradation has occurred and was identified as one of the key factors limiting wild production. Since resident coastal cutthroat have similar freshwater habitat requirements as anadromous cutthroat, coho, and winter steelhead, we believe that their status is also depressed.

FACTORS AFFECTING PRODUCTION

Habitat--The coastal cutthroat trout's extended freshwater residency and the anadromous form's near-shore migratory patterns require specific and varied freshwater and estuarine habitat types. The Elochoman and Skamokawa ecosystems have been degraded by past and present human activities that have reduced the habitat quality, quantity and complexity. The primary land-use activities responsible for habitat degradation include road building, timber harvesting, agriculture, and rural development. These upslope and riparian activities have increased sediment, reduced woody debris availability and recruitment, increased water temperatures, changed runoff patterns, and reduced river flow.

Most land in these watersheds is managed for timber production. Logging in the riparian zone has produced riparian habitat which is low in species diversity and remains in early successional stages. As a result, summer water temperatures are elevated, and large woody debris is lacking. North Elochoman River Watershed Analysis indicated that

increased fine sediment limits fish production (DNR 1996). Increases in fine sediment decreases survival of trout eggs and alevins, reduces stream productivity and ultimately food availability, and decrease the size and depth of pools which are important rearing and adult holding areas for cutthroat trout. Large pools (> 50 sq yds and > 6 ft deep) have been reduced by 84% on the Elochoman River since 1945 (USFS et al. 1993). Increases in large woody debris would increase fish productivity by forming and maintaining pools, providing fish cover, and trapping spawning gravel.

Elochoman/Skamokawa Creek anadromous cutthroat use the Columbia River estuary during the late winter, spring and summer. Sherwood et al. (1990) estimated that the tidelands, swamps and wetlands in the Columbia River estuary were reduced by 40% from 1870 to 1970. The recent changes in ocean current patterns, such as El Niño have reduced smolt-to-adult survival of all Columbia River salmonids. Smolt-to-adult survival of hatchery anadromous cutthroat released in the Columbia Basin has decreased since the 1980s (Byrne 1995; Tipping 1995). Reduction in estuarine habitat and poor near-shore ocean conditions have contributed to the decline of anadromous cutthroat trout.

Harvest Management--There is no directed commercial harvest of coastal cutthroat trout although small numbers have been caught in the lower Columbia River gill net salmon fishery. Angler harvest of wild coastal cutthroat was high but has tapered off dramatically as sportfishing regulations have become more restrictive over the years to protect cutthroat. Tributaries are closed to protect spawning adults. A 12-inch minimum size limit in mainstem streams was adopted in 1985 to permit most females to spawn at least once. A wild cutthroat release regulation took effect in 1992 limiting harvest to hatchery fish. In addition juvenile protection occurs in the form of stream closures to protect smolts from March 15 to May 31. In 1994 a two-trout daily limit with an 8-inch minimum size limit was adopted for tributaries to protect resident fish. Since wild cutthroat harvest is prohibited in mainstems and limited in tributaries, directed harvest is not considered significant. The extent of wild cutthroat mortality from hooking and illegal harvest is unknown but is believed to be low.

Hatchery--There are two hatcheries on the Elochoman River. Beaver Creek Hatchery at RM 6 and Elochoman Hatchery at RM 9 were constructed in the late 1950s under the Mitchell Act to mitigate for the anadromous fish losses caused by the construction and operation of mainstem hydroelectric dams on the Columbia River. Beaver Creek Hatchery released steelhead and anadromous cutthroat trout while the Elochoman Hatchery produces coho and fall chinook. Beaver Creek Hatchery was closed in 1999 due to budget constraints. Ecological impacts to wild cutthroat trout from salmon and steelhead hatchery releases are a concern, and they are currently being investigated (Fuss et al. 1996).

Artificial production of coastal cutthroat in southwest Washington began in 1958 from adults captured in the Green, Nemah, and Elochoman rivers (Lavier 1959). In 1963 fry

from a captive brood stock derived from the Alsea River in Oregon were imported. In 1967-68 an anadromous cutthroat/steelhead hybrid was developed. In 1968 all the stocks mentioned above were combined with some Cowlitz basin stocks. Hybridization of stocks, use of captive brood, hybridization with steelhead, and advancement of the spawn timing has likely limited the spawning success of these hatchery fish in the wild. However, when interbreeding with wild stocks does occur the results are likely to be detrimental to wild stocks.

The coastal cutthroat hatchery program consisted of two releases in the lower mainstem of the Elochoman River. The first took place in April and was a release of smolted fish intended to increase the numbers of anadromous fish. The same group of fish was held until late May when many of these fish lost their smolt appearance and were then released. The second release was made to provide catchable fish for the opening day fishery in late May (Lucas 1980). In the early 1980s, the coastal cutthroat program focus switched to the anadromous form and the late May releases were discontinued. No hatchery smolts were released into Skamokawa Creek. From 1989 to 1993 an average of 34,620 anadromous coastal cutthroat smolts were released into the Elochoman River from Beaver Creek Hatchery annually. Interactions between hatchery and wild cutthroat remain a concern.

Other Factors--Marine mammal populations along the west coast including the Columbia River have increased since they were protected under the federal Marine Mammal Protection Act in 1976. Current population estimates are estimated to range from 300-500 sea lions and more than 3,000 harbor seals in the Columbia River. As these populations have increased, so has their food and fish consumption. Both sea lions and seals are most abundant from late winter through spring and can intercept both anadromous cutthroat smolts and kelts as they move toward the estuary. Anadromous cutthroat adults returning to Beaver Creek Hatchery were examined for marine mammal marks. The percentage of returning adults with marks ranged from 0% to 16% and averaged 7% since 1982. Estimates of cutthroat predation by marine mammals have not been made, but the marine mammal mark rate indicates that in some years it may be high.

LOWER COLUMBIA — ABERNATHY CREEK/GERMANY CREEK/MILL CREEK/COAL CREEK COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Abernathy Creek/Germany Creek/Mill Creek/Coal Creek coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds. Abernathy, Germany, Mill and Coal creeks enter the Columbia River between RM 53 and RM 56. Because of the proximity of these streams, their similar sizes and drainage characteristics, and the limited biological information available for them, cutthroat in these creeks have been combined into one stock complex. However, as more biological and genetic data become available, cutthroat in these creeks may be classified as separate stocks or stock complexes.

Anadromous, resident and fluvial forms distribute themselves throughout these watersheds. The anadromous form has access to most of the watersheds with the exception of upper tributary reaches where a combination of steep gradient and high flow can limit passage, and the areas above the falls on Slide and Cameron creeks, which are tributaries of Abernathy Creek. The resident forms have been observed throughout the system.

The data on anadromous cutthroat are limited, but we believe that the timing of stream entry and spawning in Abernathy, Germany, Mill and Coal creeks is similar to that of Elochoman fish which enter the river from late July through mid-April, with peak entry in the fall, with spawning occurring January through April. Fluvial and resident spawning times have not been documented in this watershed but are believed to be similar to the anadromous spawning time. Size, age, coloration, and genetic data are unavailable for this stock. However, it is believed that these data would be similar to those for other Columbia River stocks. Anadromous coastal cutthroat life history data are available for the Kalama, Toutle, and Cowlitz River (Hulett 1995; Loch 1982, Loch and Downing 1990; Loch and Pahutski 1991, 1992; Loch and Byrd 1993; Tipping and Springer 1980; Tipping 1982). Genetic sampling within these drainages has not yet been conducted.

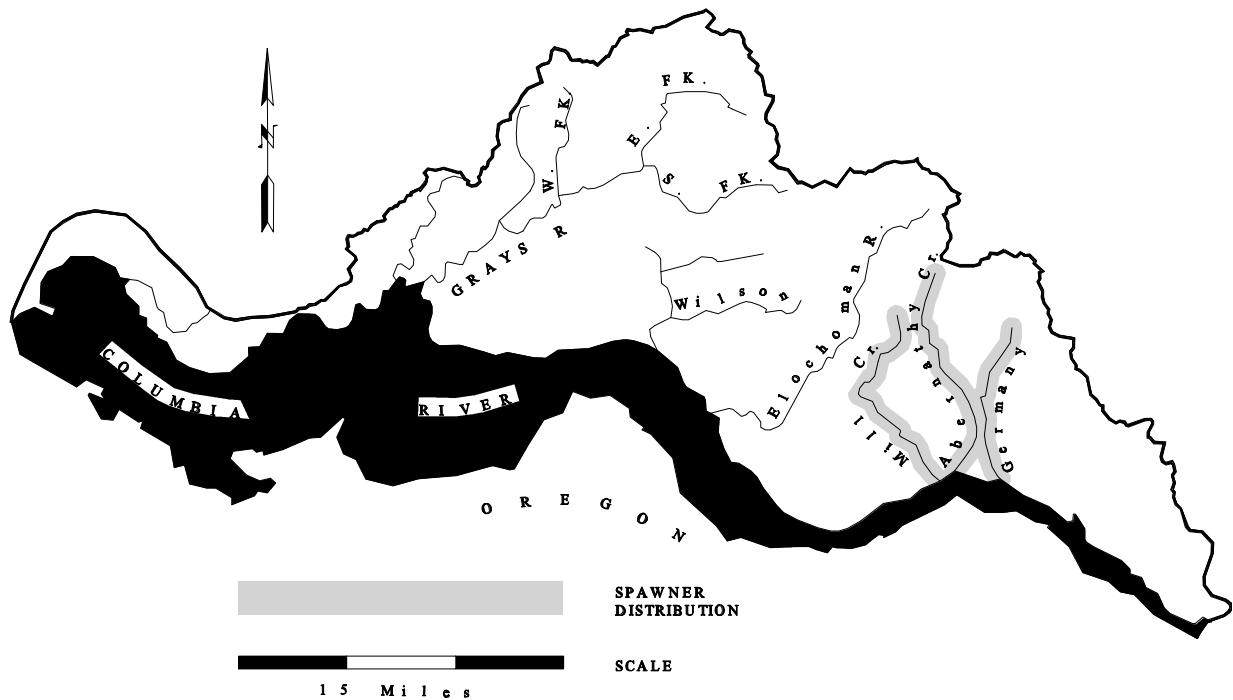
Abernathy Creek/Germany Creek/Mill Creek/Coal Creek coastal cutthroat are native and are sustained by wild production.

STOCK STATUS

The status of the Abernathy Creek/Germany Creek/Mill Creek/Coal Creek stock is Depressed based on chronically low counts at the Abernathy fish trap and a long-term decline in the Columbia River sport catch from RM 48 to RM 66. Although the surveys did not attempt to estimate trends among the various life history forms, it is thought that they represent mainly anadromous and fluvial types. Wild anadromous escapement

STOCK DEFINITION PROFILE for Abernathy, Germany, Mill, and Coal Creeks Coastal Cutthroat

SPAWNER DISTRIBUTION
DISTINCT? - UNKNOWN



TIMING	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													No
Anad Spawning													No

Timings are unknown. These timings are based on those of the Elochoman stock complex.

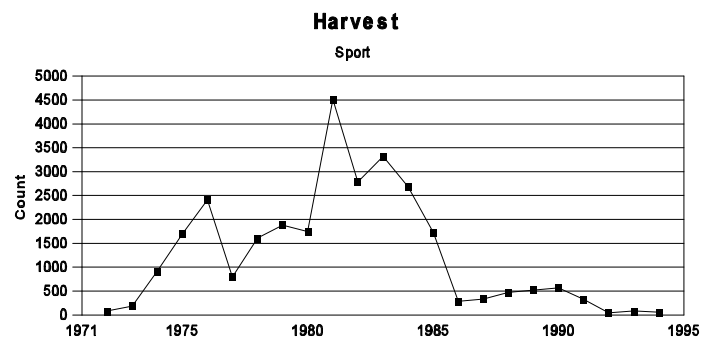
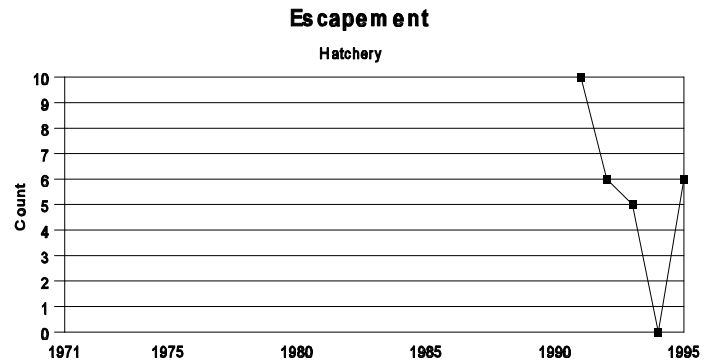
BIOLOGICAL CHARACTERISTICS
DISTINCT? - Unknown

STOCK STATUS PROFILE for Abernathy, Germany, Mill, and Coal Creeks Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> Fair

Return Years	ESCAPE Hatchery	HARVEST Sport	ESCAPE Hatcher y	
1971				
1972		84		
1973		188		
1974		913		
1975		1,698		
1976		2,410		
1977		797		
1978		1,610		
1979		1,879		
1980		1,744		
1981		4,513		
1982		2,786		
1983		3,322		
1984		2,682		
1985		1,728		
1986		291		
1987		335		
1988		473		
1989		520		
1990		568		
1991	10	328	14	
1992	6	42	1	
1993	5	83	2	
1994	0	61	0	
1995	6		0	



AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Depressed

Screening Criteria

Long-term negative trend

has been measured between zero and ten fish since 1991. The trap on Abernathy Creek is operated to collect chinook salmon brood stock, and to make the escapement estimates of coho and steelhead. Its efficiency for cutthroat is unknown. Columbia River cutthroat sport catch data from 1972 to 1995 are available from a survey conducted to estimate salmon and steelhead catch, but cutthroat trout catches were reported as well. Data quality from the survey is fair. Because the survey targeted salmon and steelhead, changes in angling effort for cutthroat cannot be quantified. Some sampling inconsistencies were apparent in the early to mid-1970s, and in some years sampling was incomplete. More restrictive angling regulations, implemented during the survey, also appear to have reduced cutthroat catch, but the extent of this reduction has not been determined. Angler tag recoveries for Cowlitz Hatchery anadromous cutthroat in this area are high, indicating that both Cowlitz and Abernathy Creek stocks contribute to the catch in this area.

The catch between 1971 and 1991 was composed of both hatchery and wild fish. Small samples from this fishery were collected between 1979 and 1982. Tipping (1982) found that 20% of the catch was wild (n=31). Sampling in 1979 and 1980 indicated that 50% of the catch was wild. Columbia River estuary sampling in 1981 indicated that 21% of the sample (n=141) was wild (Loch 1982). The catch data suggest a decline in cutthroat abundance over time.

There are no population-size data, only distribution data, for resident Abernathy Creek/Germany Creek/Mill Creek/Coal Creek cutthroat, so the status of this life history form cannot be assessed. WDF et al. (1993) characterized Mill, Abernathy, and Germany creeks coho and winter steelhead stocks as Depressed. Severe habitat degradation has occurred and was identified as one of the key factors limiting wild production. Since resident Abernathy Creek/Germany Creek/Mill Creek/Coal Creek coastal cutthroat have similar freshwater habitat requirements as anadromous cutthroat, coho and winter steelhead, we believe that their production is also depressed.

FACTORS AFFECTING PRODUCTION

Habitat--The coastal cutthroat trout's extended freshwater residency and the anadromous form's near shore migratory patterns require specific and varied freshwater and estuarine habitat types. The Mill, Abernathy, and Germany creeks ecosystems have been degraded by past and present human activities that have reduced the habitat quality, quantity, and complexity. The primary land-use activities responsible for habitat degradation include road building, timber harvesting, agriculture, and rural development. These upslope and riparian activities have increased sediment, reduced woody debris availability and recruitment, increased water temperatures, changed runoff patterns, and reduced river flow.

Most land in these watersheds is managed for timber production. Logging in riparian zones has produced riparian habitat which is simple and in early successional stages. As a result, summer water temperatures are elevated, and large woody debris is lacking. The Elochoman Block Fish and Habitat Analysis, which includes Mill and Abernathy creeks indicated that increased fine sediments in stream and lack of large woody debris limit fish production (Hunter 1995). Increases in fine sediment decrease survival of trout eggs and alevins, reduce stream productivity and ultimately food availability, and decrease the size and depth of pools which are important rearing and adult holding areas for cutthroat trout. Large pools (> 50 sq yds and > 6 ft deep) have been reduced by 44% in Germany Creek since 1945 (USFS et al. 1993). Increases in large woody debris would increase fish productivity by forming and maintaining pools, providing fish cover, and trapping spawning gravel.

Abernathy Creek/Germany Creek/Mill Creek/Coal Creek anadromous cutthroat use the Columbia River estuary primarily during the late winter, spring and summer. Sherwood et al. (1990) estimated that the tidelands, swamps, and wetlands in the Columbia River estuary were reduced by 40% from 1870 to 1990. The recent changes in ocean current patterns, such as El Niño, have reduced smolt-to-adult survival of all Columbia River salmonids. Smolt-to-adult survival of hatchery anadromous cutthroat released in the Columbia Basin has decreased since the 1980s (Byrne 1995; Tipping 1995). Reduction in estuarine habitat and poor near-shore ocean conditions have contributed to the decline of anadromous cutthroat trout.

Harvest Management--There is no directed commercial harvest of coastal cutthroat trout, although small numbers have been caught in the lower Columbia River gill net fishery. Angler harvest of wild coastal cutthroat was high but has tapered off dramatically as sportfishing regulations have become more restrictive over the years to protect cutthroat. Tributaries are closed to protect spawning adults. A twelve-inch minimum size in mainstem streams was adopted in 1985 to permit most females to spawn at least once. A wild cutthroat release regulation took effect in 1992 limiting harvest to hatchery fish. In addition, juvenile protection occurs in the form of stream closures to protect smolts from March 15 to May 31. In 1994 a two-trout daily limit with an eight-inch minimum size was adopted for tributaries. Since wild cutthroat harvest is prohibited in mainstems and limited in tributaries, directed harvest is very low. Wild mortality is unknown but believed to be low from both hooking mortality and illegal harvest.

Hatchery--The Abernathy Fish Technology Center (USFWS) operates a hatchery on Abernathy Creek which raises fall chinook. The hatchery was constructed in the late 1950s under the Mitchell Act to mitigate for the anadromous fish losses caused by the construction and operation of mainstem hydroelectric dams on the Columbia River.

The WDFW coastal cutthroat hatchery program consisted of two releases into Abernathy, Mill and Germany creeks each year. The first took place in April and was a release of

smolted fish intended to increase numbers of anadromous fish. The same group of fish was held until late May when many of these fish lost their smolt appearance and then were released. This second release was made to provide catchable fish for the opening day fishery in late May (Lucas 1980). In the early 1980s, the coastal cutthroat program focus switched to the anadromous form, and the late May releases were discontinued. From 1989 to 1993 an average of 5,700, 5,620, and 5,600 anadromous coastal cutthroat smolts were released annually into Mill, Abernathy, and Germany creeks respectively from Beaver Creek Hatchery. More recent hatchery releases were much smaller, with 2,000 smolts going only into Abernathy Creek. Please see the Elochoman stock report for more information about the Beaver Creek Hatchery stock. Interactions between hatchery and wild cutthroat remain a concern.

Other Factors--Marine mammal populations along the west coast including the Columbia River have increased since they were protected under the federal Marine Mammal Protection Act in 1976. Current population estimates range from approximately 300-500 sea lions and in excess of 3,000 harbor seals in the Columbia River (NOAA 1997). As these populations have increased, so has their food and fish consumption. Both sea lions and seals are most abundant from late winter through spring and can intercept both anadromous cutthroat smolts and kelts as they move toward the estuary. Anadromous cutthroat adults returning to Beaver Creek Hatchery were examined for marine mammal marks. The percentage of returning adults with marks ranged from 0% to 16% and averaged 7% since 1982. Estimates of cutthroat predation by marine mammals have not been made, but the marine mammal mark rate indicates that in some years it may be high.

LOWER COLUMBIA — COWLITZ COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Cowlitz coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds.

Anadromous, resident, fluvial and adfluvial forms distribute themselves throughout the watershed. Historically the anadromous form had access to most of the watershed with the exception of upper tributary reaches, where a combination of steep gradient and high flow can limit passage. However, with the construction of Mayfield and Mossyrock dams in the 1960s, anadromous cutthroat were unable to access historically important rivers such as the Tilton, Cispus and upper Cowlitz rivers. The resident form has been observed throughout the system and presently is the only form above Mayfield Dam. The adfluvial form is present in the three Cowlitz reservoirs of Mayfield, Riffe and Scanewa.

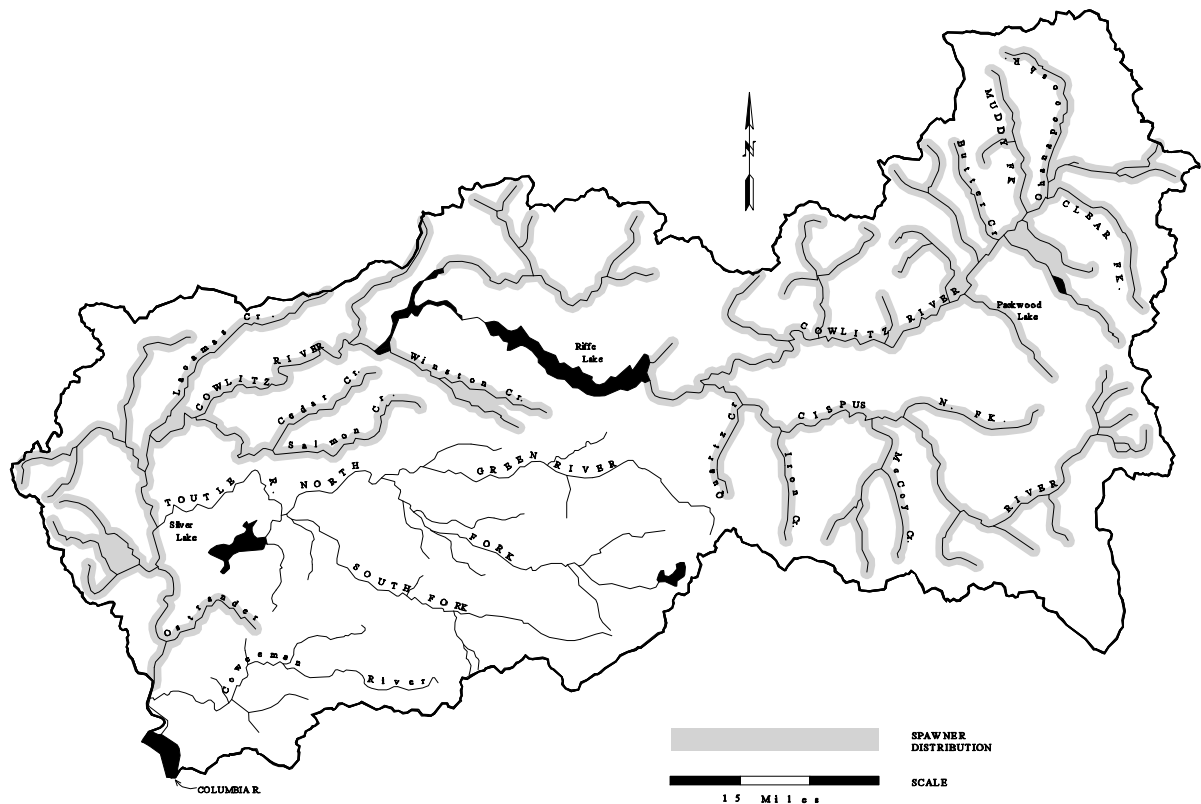
As with other wild Columbia River anadromous cutthroat, entry into the Columbia River commences in late July and continues through October. Peak entry into the Cowlitz occurs in August and September (Jack Tipping, WDFW, personal communication). Spawning activity occurs from January through April. Adfluvial, fluvial and resident spawning times have not been documented in this watershed but are believed to be similar to the anadromous spawning time in the lower river. As elevations increase spawning time is likely to be later because of colder water temperatures. Spawning is likely to occur as late as June in higher elevations. As a result of artificial selection for early spawning, hatchery cutthroat in the Cowlitz watershed now spawn from November to February. Smolt migration occurs in the spring after juveniles have spent two to three years in freshwater (Tipping and Springer 1980). Not all cutthroat spawn on initial entry to freshwater; mature fish represent between 53% and 71.7% of initial-entry fish (Tipping 1981). Tipping and Springer (1980) and Tipping (1982) give age-specific data for this stock.

The relationship of this stock complex to other stocks and stock complexes is unknown. Genetic sampling and analysis are needed to make this determination. In 1981 samples from 10 groups of cutthroat in the Cowlitz were collected for genetic analysis. Two populations were Cowlitz Trout Hatchery populations, and the remaining eight were wild anadromous/resident or resident populations (Tipping 1982). The analysis showed little genetic variation among sample groups. In 1994 and 1995 samples were collected from wild resident and hatchery anadromous populations for allozyme and DNA analysis. The Cowlitz collection proved to be significantly different from other lower Columbia collections except the Elochoman/Skamokawa Creek collection. The Cowlitz Trout Hatchery stock was mixed with the Beaver Creek Hatchery stock, so the similarity of these two hatchery stocks is not surprising.

STOCK DEFINITION PROFILE for Cowlitz Coastal Cutthroat

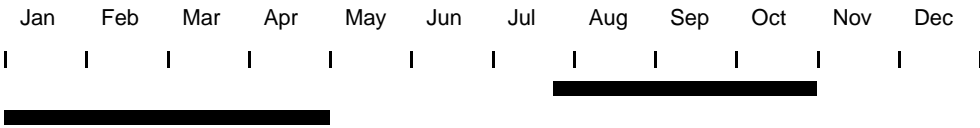
SPAWNER DISTRIBUTION

DISTINCT? - UNKNOWN



TIMING

Anad Riv Entry
Anad Spawning



DISTINCT?

No
No

BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

GENETICS - The Cowlitz Hatchery collection (N=119), made in 1995, was not significantly different from the Beaver Creek Hatchery collection (Elochoman/Skamokawa Cr. stock complex) (33 allozyme-locus G-tests; $P<0.005$) but was distinct from the Kalama and Lewis collections (33 allozyme-locus G-tests; $P<0.001$).

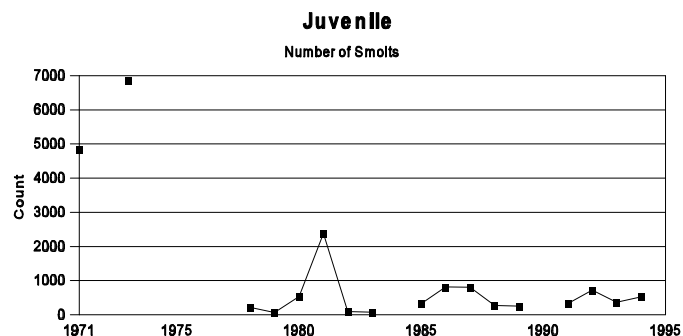
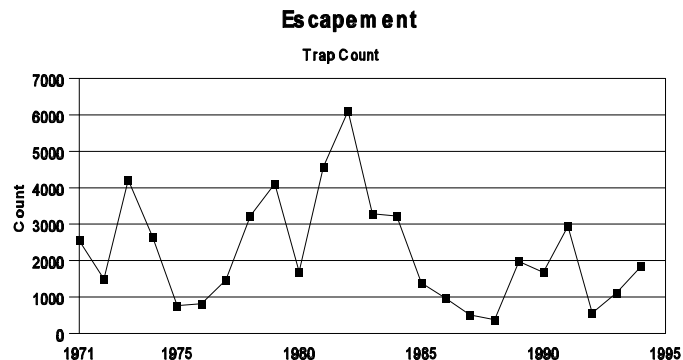


STOCK STATUS PROFILE for Cowlitz Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> Fair

Return Years	ESCAPE Trap count	JUVENILE Smolts	HARVEST Sport	
1971	2,546	4,826		
1972	1,495		382	
1973	1,217	6,868	273	
1974	2,652		976	
1975	764		1,707	
1976	816		2,675	
1977	1,465		814	
1978	3,235	213	1,636	
1979	4,111	60	1,879	
1980	1,689	536	1,744	
1981	4,577	2,382	4,513	
1982	6,103	88	3,027	
1983	3,282	78	3,759	
1984	3,323		2,801	
1985	1,385	327	1,732	
1986	965	812	312	
1987	508	804	360	
1988	383	271	483	
1989	1,980	253	727	
1990	1,683		631	
1991	2,937	326	370	
1992	556	716	83	
1993	1,115	364	89	
1994	1,848	531	64	
1995				



AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Depressed

Screening Criteria

Long-term Negative Trend

Cowlitz coastal cutthroat trout are native and are sustained by wild production.

STOCK STATUS

The status of the Cowlitz stock complex is Depressed based on chronically depressed adult and juvenile trap counts and a long-term decline in the Columbia River catch from RM 72 to RM 48. Anadromous cutthroat were counted at Mayfield Dam from 1962 to 1996. Counts ranged from 5,458 to 12,324 and averaged 8,698. The five-year average from 1990 to 1994 was 1,628 hatchery and wild cutthroat. This is only 19% of the 1962-66 average. The Mayfield migrant trap is operated to monitor passage of fish from Mayfield Reservoir into the Cowlitz River. Counts of cutthroat outmigrants from 1964 to 1966 averaged 5,295. The recent five-year average is 484 fish, only 9% of the 1964-66 average.

Columbia River cutthroat sport catch data from 1972 to 1995 were collected during a survey to estimate salmon and steelhead catch (Leider 1997). Data quality from the survey is fair. Because the survey targeted salmon and steelhead, changes in angling effort for cutthroat cannot be quantified. Some sampling inconsistencies were apparent in the early to mid-1970s, and in some years sampling was incomplete. More restrictive angling regulations, implemented during the survey, also appear to have reduced cutthroat catch, but the extent of this reduction has not been determined.

Cowlitz River hatchery cutthroat trout are harvested in the Columbia River fishery. Tipping (1986) found that 31.5% of the tag returns for Cowlitz Hatchery fish were from the Columbia River fishery. The bulk of this fishery takes place along the Washington shore between the mouth of the Cowlitz and the town of Cathlamet. Small samples from this fishery and from the estuary were collected between 1979 and 1982. Tipping (1982) estimated that 20% of the catch was wild in 1981 (n=31). Sampling in 1979 and 1980 indicated that 50% of the catch was wild. Estuary sampling in 1981 indicated that 21% of the sample (n=141) was wild (Loch 1982).

The earliest estimate of sport catch of anadromous cutthroat was at least 20,000 with 6,000 of these caught above Mayfield Dam (Kray 1957). Minimum estimates of sport catch for 1979, 1980, and 1981 ranged from 5,014, 123, and 1,226 fish (Tipping 1982). Scale analysis indicated that the proportion of wild cutthroat in the catch declined from 40% to 20% during this time. Devore (1987) estimated the catch at 3,644, 3,724, and 5,592 for 1983, 1984 and 1985 respectively. Many of the fish were harvested in the lower Cowlitz River, and we do not know what portion of these wild fish were destined for the Toutle, Coweeman, or other rivers in the Cowlitz basin.

There are no population-size data, only distribution data, for resident Cowlitz cutthroat, so the status of this life history form cannot be assessed. WDF et al. (1993) characterized the Cowlitz River chinook, coho, and winter steelhead stocks as depressed. Severe habitat

degradation had occurred and was identified as one of the key factors limiting wild production. Since resident coastal cutthroat have similar freshwater habitat requirements as anadromous cutthroat, coho and winter steelhead, we believe that their status is also depressed.

FACTORS AFFECTING PRODUCTION

Habitat--The coastal cutthroat trout's extended freshwater residency and the anadromous form's near-shore migratory patterns require specific and varied freshwater and estuarine habitat types. The Cowlitz River ecosystem has been degraded by past and present human activities that have reduced fish habitat, quality, quantity, and complexity. The primary land-use activities responsible for habitat degradation include hydroelectric development, road building, timber harvesting, agriculture and rural development. The construction of Mayfield and Mossyrock dams in the 1960s eliminated anadromous fish access to historically productive areas. Upslope and riparian activities have increased sediment, reduced woody debris availability and recruitment, increased water temperatures, changed runoff patterns, and reduced river flow.

Most land in this watershed is managed for timber production. Logging in the riparian zone has produced riparian habitat which has reduced ecosystem diversity and is locked into early successional stages. As a result, summer water temperatures are elevated, and large woody debris is lacking. Increases in fine sediment in streams in the watershed have decreased survival of trout eggs and alevins, reduced stream productivity and ultimately food availability, and decreased the size and depth of pools which are important rearing and adult holding areas for cutthroat trout. Large pools (> 50 sq yds and > 6 ft deep) have been reduced by 58% on the Cowlitz River since 1945 (USFS et al. 1993). Increases in large woody debris would increase productivity by forming and maintaining pools, providing fish cover, and trapping spawning gravel.

Cowlitz sea-run cutthroat use the Columbia River estuary during late winter, spring and summer. Sherwood et al. (1990) estimated that the tidelands, swamps and wetlands in the Columbia River estuary were reduced by 40% from 1870 to 1970. The recent changes in ocean current patterns, such as El Niño have reduced smolt-to-adult survival of all Columbia River salmonids. Smolt-to-adult survival of hatchery anadromous cutthroat released in the Columbia Basin has decreased since the 1980s (Byrne 1995, Tipping 1995). Reduction in estuarine habitat and poor near-shore ocean conditions have also contributed to the decline of anadromous cutthroat trout.

Harvest Management--There is no directed commercial harvest of coastal cutthroat trout although small numbers have been caught in the lower Columbia River salmon gill net fishery. Angler harvest of wild cutthroat was high but has tapered off dramatically as sportfishing regulations have become more restrictive over the years to protect coastal cutthroat. Tributaries are closed to angling to protect spawning adults. A 12-inch minimum

size limit in the mainstem streams was adopted in 1985 to permit most females to spawn at least once. In 1986 the daily limit on the Columbia River was reduced from eight to two trout. In addition, juvenile protection occurs in the form of stream closures from March 15 to May 31 to protect smolts. In 1992 a regulation requiring release of wild cutthroat was adopted, limiting harvest to hatchery fish. In 1994 a two-trout daily limit with an eight-inch minimum size limit was adopted for tributaries to protect resident cutthroat. Since wild cutthroat harvest is prohibited in mainstems and limited in tributaries, directed harvest is very low. The extent of wild cutthroat mortality from hooking and illegal harvest is unknown but believed to be low.

Hatchery--Cowlitz Trout and Cowlitz Salmon hatcheries were constructed in 1967 downstream of Mayfield Dam by Tacoma Public Utilities to mitigate for salmonid losses caused by the construction of Mayfield and Mossyrock dams. These facilities produce and release winter and summer steelhead, spring and fall chinook, and coho salmon. Ecological impacts to wild cutthroat from these hatchery releases are unknown.

Artificial production of anadromous cutthroat on the Cowlitz River began in 1968 at Cowlitz Trout Hatchery. Beaver Creek brood stock were originally imported to start the hatchery program, and they were combined with Cowlitz natives. In 1976 Beaver Creek brood stock importation was discontinued, and eggs were collected only from local wild fish. Females are spawned primarily from November to February. If fish returning to the hatchery are numerous, eggs are collected only from larger repeat migrants (WDW 1988). The goal of the program is 115,000 smolts larger than 210 mm in length to produce a return to the hatchery of 5,000 adults. Fish are released into Blue Creek, the Cowlitz and Coweeman rivers, and Salmon Creek. Advancement of hatchery fish spawning time has reduced the possibility of interbreeding with wild fish. However, hatchery/wild interactions remain a concern.

Other Factors--Marine mammals populations along the West Coast including the Columbia River have increased since they were protected under the federal Marine Mammal Protection Act in 1976. Current population estimates range from 300-500 sea lions, and with more than 3,000 harbor seals in the Columbia River. As these populations have increased, so has their food and fish consumption. Both sea lions and seals are most abundant from late winter through spring and can intercept both sea-run cutthroat smolts and kelts as they move toward the estuary. Anadromous cutthroat adults returning to Beaver Creek Hatchery were examined for marine mammal marks. The percentage of returning adults with marks ranged from 0% to 16% and averaged 7% since 1982. Estimates of cutthroat predation by marine mammals have not been made, but the marine mammal mark rate indicates that in some years it may be high.

LOWER COLUMBIA — COWEEMAN COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Coweeman coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds. The Coweeman River enters the Cowlitz River at RM 1. Anadromous, fluvial and resident cutthroat life history forms in the river distribute themselves throughout the watershed. The anadromous form has access to most of the watershed with the exception of the area above Washboard Falls at RM 31 and of upper tributary reaches, where a combination of steep gradient and high flow limits passage. The fluvial and resident forms have been observed throughout the system. There is no record of hatchery cutthroat releases in this drainage.

As with other wild Columbia River sea-run cutthroat, entry into the Columbia River commences in late July and continues through mid-April. Although the data on anadromous Coweeman fish are limited, we believe that river entry timing and spawn timing are similar to those of Cowlitz and Toutle rivers fish. River entry into these streams occurs from August through March, with peak entry in the fall. Spawning activity occurs from January through April. Fluvial and resident spawning times have not been documented in this watershed but are believed to be similar to the anadromous spawning time. Anadromous spawn time was determined from fish returning to the Beaver Creek Hatchery, located on the Elochoman River, during the initial years of anadromous cutthroat brood stock collection. Advancement of spawning time had hatchery cutthroat spawning from December to February (Byrne, 1995). Size, age, and coloration data are unavailable for this stock. However, it is believed that they would be similar to other Columbia River stocks. No genetic sampling has been done in this drainage. Anadromous cutthroat life history data are available for the Kalama, Toutle, and Cowlitz rivers (Hulett 1995; Loch 1982; Loch and Downing 1990; Loch and Pahutski 1991, 1992 and Loch and Byrd 1993; Tipping and Springer 1980; and Tipping 1982).

Coweeman coastal cutthroat are considered native and are sustained by natural production.

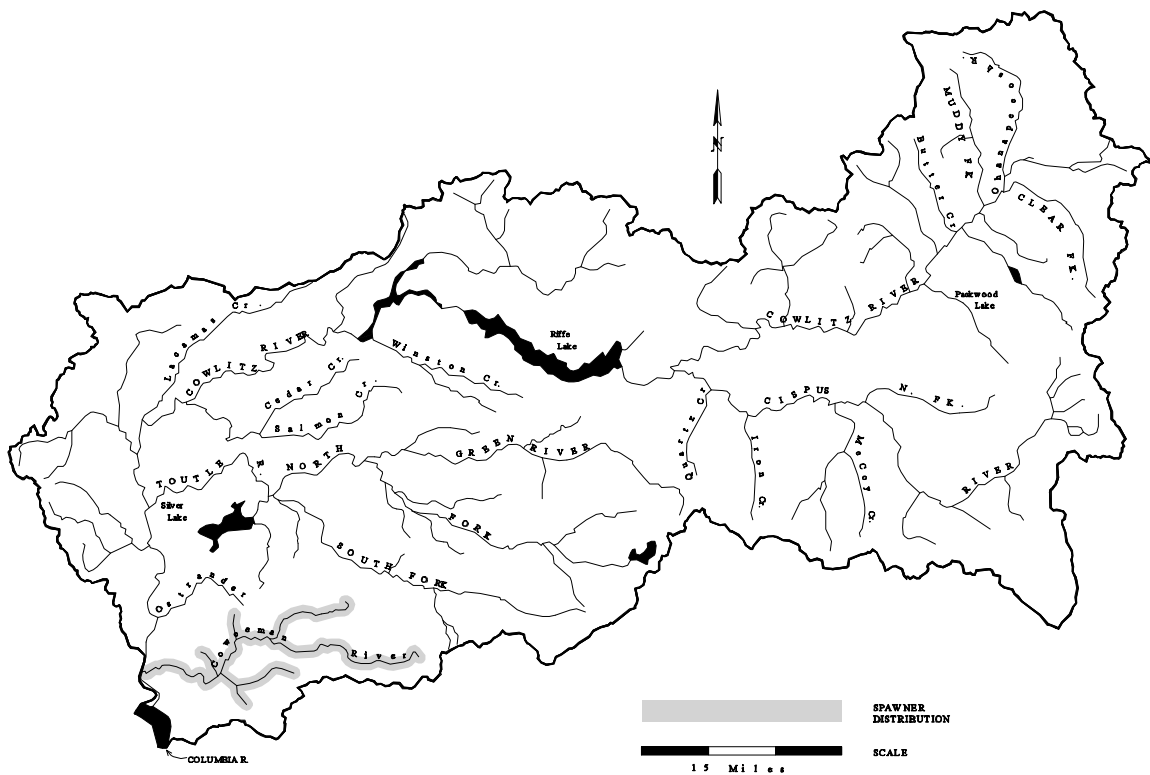
STOCK STATUS

The status of Coweeman coastal cutthroat is Depressed based on a long-term negative trend in the Columbia River (RM 48 to RM 72) cutthroat catch. Catch data are from a 1972 to 1995 survey of Columbia River fisheries designed to estimate salmon and steelhead catch, therefore changes in angling effort for cutthroat cannot be quantified. Some sampling inconsistencies were apparent in the early to mid-1970s, and in some

STOCK DEFINITION PROFILE for Coweeman Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - UNKNOWN



<u>TIMING</u>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													No
Anad Spawning													No

Timings are unknown. These timings are based on those for the Cowlitz stock complex.

BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

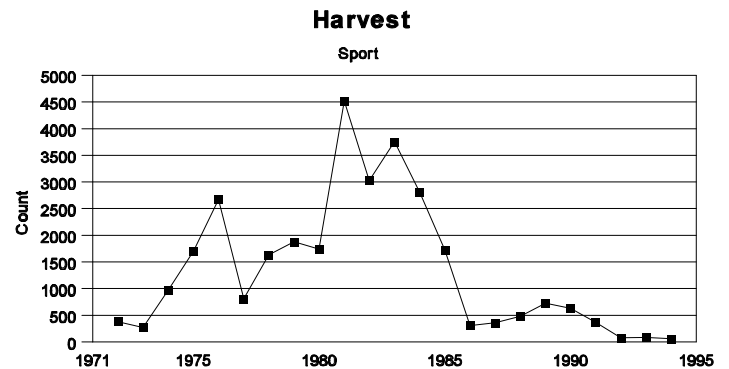
STOCK STATUS PROFILE for Coweeman Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> Fair

Return Years	HARVEST Sport			
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1971	
1972	382
1973	273
1974	976
1975	1,707
1976	2,675
1977	814
1978	1,636
1979	1,879
1980	1,744
1981	4,516
1982	3,027
1983	3,759
1984	2,801
1985	1,732
1986	312
1987	360
1988	483
1989	727
1990	631
1991	370
1992	83
1993	89
1994	64
1995	



AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Depressed

Screening Criteria

Long-term negative trend

years sampling was incomplete. More restrictive angling regulations during the survey period also appear to have reduced cutthroat catch. Overall, data quality is fair.

The catch between 1971 and 1991 was composed of both hatchery and wild fish. Small samples from this fishery were collected between 1979 and 1982. Sampling for 1979 and 1980 indicated that 50% of the catch was wild. While Tipping (1982) found that 20% of the catch was wild (n=31). Columbia River estuary sampling in 1981 indicated that 21% of the sample (n=141) was wild (Loch 1982). The catch data suggest a decline in cutthroat abundance over time.

There are no population size data, only distribution data, for resident Coweeman cutthroat, so the status of this life history form cannot be assessed. WDF et al. (1993) described the Coweeman River chinook, coho, and winter steelhead stocks as depressed. Severe habitat degradation was identified as one of the key factors limiting wild production. Since resident coastal cutthroat have similar freshwater habitat requirements as anadromous cutthroat, coho, and winter steelhead, we believe that their status is also depressed.

FACTORS AFFECTING PRODUCTION

Habitat--The coastal cutthroat trout's extended freshwater residency and the anadromous form's near-shore migratory patterns require specific and varied freshwater and estuarine habitats. The Coweeman River ecosystem has been degraded by past and present human activities which have reduced the habitat quality, quantity and complexity. The primary land-use activities responsible for habitat degradation include road building, timber harvesting, agriculture and rural development. These upslope and riparian activities have increased sediment in streams, reduced woody debris availability and recruitment into streams, increased water temperatures, changed run-off patterns and reduced river flow.

Most land in this watershed is managed for timber production. The riparian zone is has been simplified following logging and is in early successional stages. As a result, summer water temperatures are elevated and large woody debris is lacking. Portions of the Coweeman mainstem, Baird and Mulholland creeks have been placed on the Environmental Protection Agency's list of waters that fail water quality standards due to elevated water temperatures (Herger 1996). Increases in fine sediment have decreased survival of trout eggs and alevins, reduced stream productivity and food availability, and decreased the size and depth of pools which are important rearing and adult holding areas for cutthroat trout. Large pools (> 50 sq yds in area and > 6 ft deep) have been reduced by 94% on the Coweeman since 1945 (USFS et al. 1993). Large woody debris was lacking in the upper Coweeman and its tributaries (Herger 1996). Increases in large woody debris would increase fish productivity by forming and maintaining pools, providing cover for fish and trapping spawning gravel.

Coweeman anadromous coastal cutthroat use the Columbia River estuary primarily during the late winter, spring and summer. It was estimated that the tidelands, swamps and wetlands in the Columbia River estuary were reduced by 40% between 1870 and 1970 (Sherwood et al. 1990). The recent changes in ocean current conditions such as El Niño have reduced smolt-to-adult survival of all Columbia River salmonids. Smolt-to-adult survival of hatchery-origin anadromous cutthroat released in the Columbia Basin has decreased since the 1980s (Byrne 1995, Tipping 1995). Reduction in estuarine habitat and poor near-shore ocean conditions have contributed to the decline of anadromous coastal cutthroat trout.

Harvest Management--There is no directed commercial harvest of coastal cutthroat trout although small numbers have been caught in the lower Columbia River salmon gill net fishery. Angler harvest of wild coastal cutthroat was high but has tapered off dramatically as sportfishing regulations have become more restrictive over the years to protect coastal cutthroat. Tributaries are closed to angling to protect spawning adults. A 12-inch minimum size limit in the mainstem streams was adopted in 1985 to permit females to spawn at least once. In 1986 the daily limit on the Columbia River was reduced from eight to two trout. In addition, juvenile protection occurs in the form of stream closures from March 15 to May 31 to protect smolts. In 1992 a regulation requiring release of wild cutthroat was adopted limiting harvest to hatchery fish. In 1994 a two-trout daily limit with an eight-inch minimum size limit was adopted for tributaries to protect resident cutthroat. Since wild cutthroat harvest is prohibited in mainstems and limited in tributaries, directed harvest is very low. The extent of wild cutthroat mortality from hooking and illegal harvest is unknown but believed to be low.

Hatchery--No hatcheries are present on the Coweeman River. However salmon, steelhead, and anadromous cutthroat are released from two hatcheries on the Cowlitz River. About 30,000 hatchery steelhead smolts were released annually into the Coweeman River from Beaver Creek Hatchery prior to its closure in 1999. Ecological impacts to wild cutthroat trout from hatchery salmon and steelhead releases are unknown.

Anadromous cutthroat smolts from Beaver Creek Hatchery were released into the Coweeman River. From 1989 to 1993 a yearly average of 12,000 smolts was planted. More recently, releases were reduced to 5,000. Most of these smolts were acclimated at a rearing site below Goble Creek. Although spawning time for the Beaver Creek Hatchery stock had been advanced, interactions between hatchery and wild cutthroat remain a concern. Please see the Elochoman River stock report for more information about this hatchery stock.

Other Factors--Marine mammals populations along the West Coast including the Columbia River have increased since they were protected under the federal Marine Mammal Protection Act in 1976. Current population estimates range from 300-500 sea lions, and with more than 3,000 harbor seals in the Columbia River. As these populations

have increased, so has their food and fish consumption. Both sea lions and seals are most abundant from late winter through spring and can intercept both sea-run cutthroat smolts and kelts as they move toward the estuary. Anadromous cutthroat adults returning to Beaver Creek Hatchery were examined for marine mammal marks. The percentage of returning adults with marks ranged from 0% to 16% and averaged 7% since 1982. Estimates of cutthroat predation by marine mammals have not been made, but the marine mammal mark rate indicates that in some years it may be high.

LOWER COLUMBIA — TOUTLE COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Toutle coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds. The Toutle River enters the Cowlitz River at RM 20. WDF et al. (1993) identified three separate steelhead stocks in the Toutle Basin, and this may be the case with coastal cutthroat, but because of limited genetic and biological data all Toutle cutthroat are currently considered to be part of one stock complex. Anadromous, resident, fluvial and adfluvial forms distribute themselves throughout the watershed. The anadromous form has access to most of the watershed with the exception of upper tributary reaches, where a combination of steep gradient and high flow limits passage. The resident and fluvial forms have been observed throughout the system. Adfluvial fish have been observed in Silver Lake.

As with other wild Columbia River anadromous cutthroat, entry to the Columbia River commences in late July and continues through mid-April. Entry to the Cowlitz occurs slightly later. Entry into the North Fork Toutle peaks between September to November with a smaller number of fish moving throughout the winter (Loch, WDFW, personal communication April 1994). Spawning activity occurs from January through June. Fluvial and resident spawning times have not been documented in this watershed but are believed to be similar to the anadromous spawning time. Anadromous spawn time was taken from wild anadromous cutthroat captured from Green River, Elochoman River, and Nemah River and held at Vancouver Hatchery and Beaver Creek Hatchery (Lavier 1960). Artificial selection for early spawn timing now has hatchery cutthroat spawning from December to February (Byrne 1995). Specific size and age data are available from the Toutle Fish Collection Facility (Loch and Downing 1990; Loch and Pahutski 1991, 1992; Loch and Byrd 1993). Coloration and genetic data are unavailable for this stock complex.

This stock complex is native with wild production.

STOCK STATUS

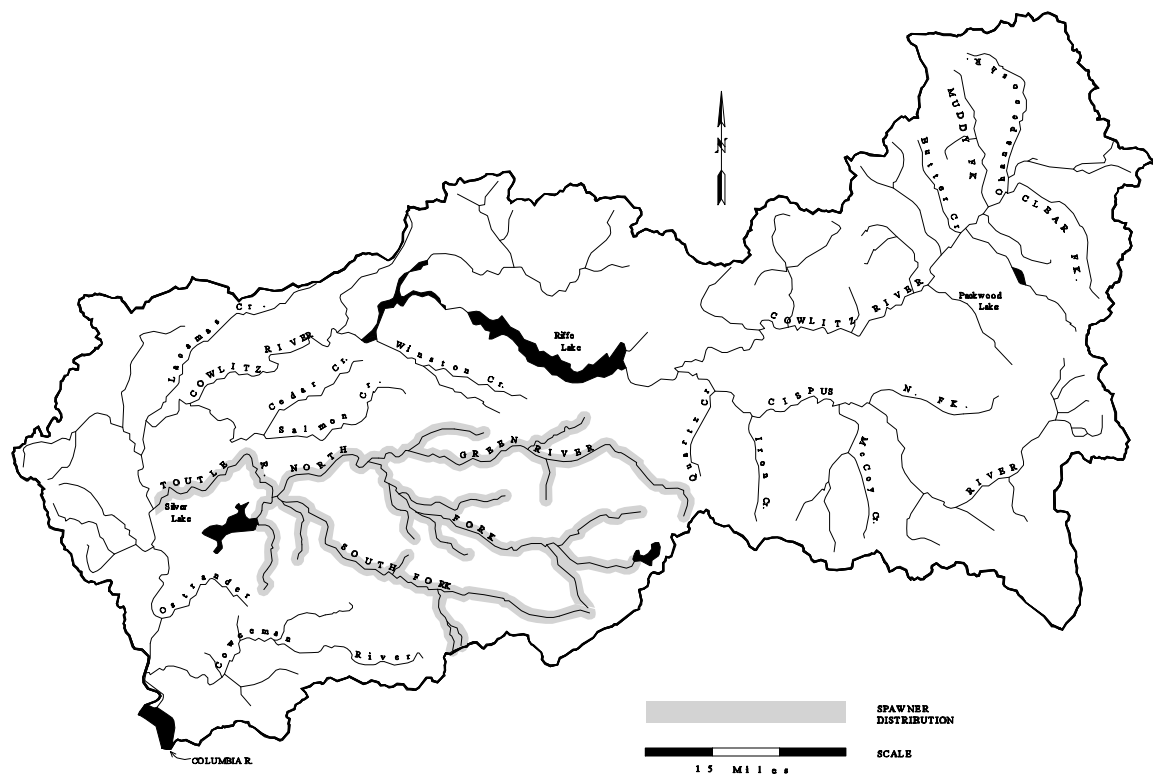
The status of Toutle coastal cutthroat is Depressed based on chronically low escapement measured at the Toutle River Fish Collection Facility and the North Toutle Hatchery, a long-term negative trend in the Columbia River catch from RM 72 to RM 48, and the habitat destruction that occurred as a result of the eruption of Mt. St. Helens in 1980. Overall, the quality of the data used to make this assessment is fair.

In 1989 the US Army Corps of Engineers completed construction of the Sediment Retention Structure and Toutle Fish Collection Facility (TFCF). Anadromous cutthroat

STOCK DEFINITION PROFILE for Toutle Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - YES



TIMING

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													No
Anad Spawning													No

BIOLOGICAL CHARACTERISTICS

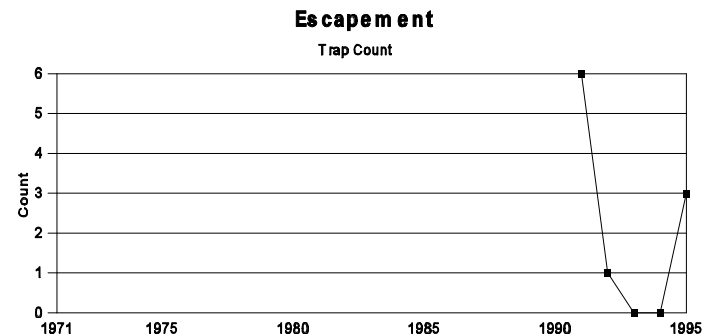
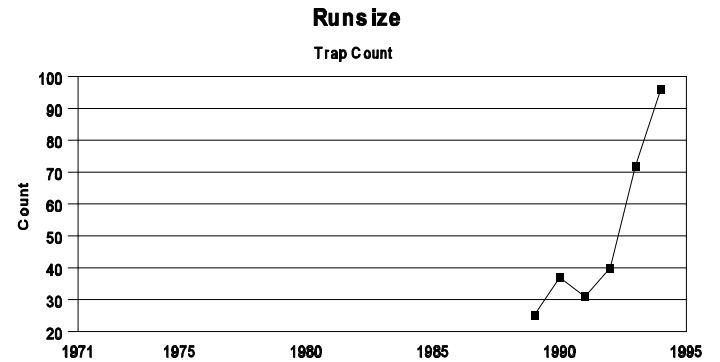
DISTINCT? - Unknown

STOCK STATUS PROFILE for Toutle Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> Fair

Return Years	RUNSIZE Trap count	ESCAPE Trap count	HARVEST Sport	
1971				
1972			382	
1973			273	
1974			976	
1975			1,707	
1976			2,675	
1977			814	
1978			1,636	
1979			1,879	
1980			1,744	
1981			4,513	
1982			3,027	
1983			3,759	
1984			2,801	
1985			1,732	
1986			312	
1987			360	
1988			483	
1989	25		727	
1990	37		631	
1991	31	6	370	
1992	40	1	83	
1993	72	0	89	
1994	96	0	64	
1995		3		



AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Depressed

Screening Criteria

Chronically low, LT neg trend

counts have been conducted at the TFCF and are listed in column 1 of the Stock Assessment section of the Stock Status Profile. This stock complex is showing a slow recovery after the Mt. St. Helens eruption, but the escapement is chronically low. Another measure of anadromous cutthroat status is the count at the North Toutle Hatchery. In 1959 a total of 74 wild anadromous cutthroat were captured at this facility during coho and chinook brood stock collections (Lavier 1960). After the reopening of this facility in 1991, annual counts have remained below six fish. There have been trap changes between 1959 and 1991, and the trap is not 100% effective for anadromous cutthroat because these small fish may pass through bar spaces designed to stop salmon and because the trap operates only during salmon collection season. However, the decline from the historic count and the low numbers indicate this stock is depressed.

Columbia River cutthroat sport catch data from 1972 to 1995 from a survey conducted to estimate salmon and steelhead catch are also available (Leider 1997). Because the survey targeted salmon and steelhead catches, changes in angling effort for cutthroat cannot be quantified. Some sampling inconsistencies were apparent in the early to mid-1970s, and in some years sampling was incomplete. More restrictive angling regulations, implemented during the survey, also appear to have reduced cutthroat catch, but the extent of this reduction has not been determined.

The catch between 1971 and 1991 was composed of both hatchery and wild fish. Small samples from this fishery were collected between 1979 and 1982. Tipping (1982) found that 20% of the catch was wild (n=31). Sampling in 1979 and 1980 indicated that 50% of the catch was wild. Columbia River estuary sampling in 1981 indicated that 21% of the sample (n=141) was wild (Loch 1982). The catch data suggest a decline in cutthroat abundance over time.

There are no population-size data, only distribution data, for resident Toutle cutthroat, so the status of this life history form cannot be assessed. WDF et al. (1993) characterized Toutle River chinook, coho, and winter steelhead stocks as depressed. Severe habitat degradation has occurred and was identified as one of the key factors limiting wild production. Since resident coastal cutthroat have similar freshwater habitat requirements as anadromous cutthroat, coho and winter steelhead, we believe that their status is also depressed.

FACTORS AFFECTING PRODUCTION

Habitat--The coastal cutthroat trout's extended freshwater residency and the anadromous form's near-shore migratory patterns require specific and varied freshwater and estuarine habitat types. The Toutle River ecosystem was dramatically altered by the eruption of Mt. St. Helens on May 18, 1980. Ash deposits and mudflows reduced riparian areas, elevated temperatures, and increased sediment in nearby streams.

This ecosystem has also been degraded by past and present human activities that have reduced the habitat quality, quantity, and complexity. The primary land use activities responsible for habitat degradation include road building, timber harvesting, agriculture and rural development. These upslope and riparian activities have increased sediment, reduced woody debris availability and recruitment, increased water temperatures, changed runoff patterns, and reduced river flow.

Most land in this watershed is managed for timber production. Logging in riparian zones has produced riparian habitat which is simple and in early successional stages. As a result summer water temperatures are elevated, and large woody debris is lacking. Increases in fine sediment have decreased survival of trout eggs and alevins, reduced stream productivity and ultimately food availability, and decreased the size and depth of pools which are important rearing and adult holding areas for cutthroat trout. Increases in large woody debris would increase fish productivity by forming and maintaining pools, providing fish cover, and trapping spawning gravel.

Toutle River anadromous cutthroat use the Columbia River estuary primarily during the late winter, spring, and summer. Sherwood et al. (1990) estimated that the tidelands, swamps, and wetlands in the Columbia River estuary were reduced by 40% from 1870 to 1970. The recent changes in ocean patterns, such as El Niño have reduced smolt-to-adult survival of all Columbia River salmonids. Smolt-to-adult survival of hatchery sea-run cutthroat released in the Columbia Basin have decreased since the 1980s (Byrne 1995; Tipping 1995). Reduction in estuary habitat and poor near-shore ocean conditions have contributed to the decline of anadromous cutthroat trout.

Harvest Management--There is no directed commercial harvest of coastal cutthroat trout although small numbers have been caught in the lower Columbia River gill net fishery. Angler harvest of wild coastal cutthroat was high but has tapered off dramatically as sportfishing regulations have become more restrictive over the years to protect cutthroat. Since the eruption of Mt. St. Helens in 1991 the Toutle River drainage has been closed to trout fishing. Wild mortality is unknown but believed to be low from hooking mortality during the steelhead/salmon season and from illegal harvest.

In 1985 the daily harvest limit on the Columbia River was reduced from eight trout to two trout with a 12-inch minimum size (subsequently increased to 14 inches) was implemented to permit most females to spawn at least once before harvest. In 1992 wild cutthroat release regulations were adopted.

Hatchery--The North Toutle Hatchery is located near the confluence of the Green and Toutle rivers. It raises chinook and coho salmon. Approximately 140,000 summer steelhead smolts had been released annually into the North Fork Toutle, South Fork Toutle and Green rivers from Beaver Creek Hatchery. Currently these releases have been reduced to 12,500 to 13,000 summer steelhead into the Green River and South Fork

Toutle from the Elochoman or Kalama hatcheries. Salmon, steelhead, and anadromous cutthroat are released from two hatcheries on the Cowlitz River. Silver Lake has received rainbow trout releases as part of a lowland lake program, but they were discontinued in the 1980s. Ecological and genetic impacts to wild cutthroat trout from hatchery salmon, steelhead and trout releases are unknown.

Other Factors--Marine mammal populations along the west coast including the Columbia River have increased since they were protected under the federal Marine Mammal Protection Act in 1976. Current population estimates range from 300-500 sea lions and 3,000 or more harbor seals in the Columbia River. As these populations have increased, so has their food and fish consumption. Both sea lions and seals are most abundant from late winter through spring and can intercept both sea-run cutthroat smolts and kelts as they move toward the estuary. Anadromous cutthroat adults returning to Beaver Creek Hatchery were examined for marine mammal marks. The percentage of returning adults with marks ranged from 0% to 16% and averaged 7% since 1982. Estimates of cutthroat predation by marine mammals have not been made, but the marine mammal mark rate indicates that in some years it may be high.

LOWER COLUMBIA — KALAMA COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Kalama coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds. Anadromous, fluvial and resident life history forms are present in the watershed. At this time anadromous cutthroat are found in the mainstem river and tributaries below Kalama Falls (RM 10). Adults captured in the trap at Kalama Falls are passed upstream. Fluvial and resident fish are found throughout the Kalama watershed in tributaries such as Elk, Wolf, Summers and Langdon creeks and in small headwater streams above anadromous zone. They are also found in independent drainages of Owl and Schoolhouse creeks.

Anadromous fish enter the river from July through December and spawn from December through June. Fluvial and resident fish spawn from February through June.

In a recent genetic analysis, Kalama cutthroat were represented by one collection (Summers Creek), which was genetically distinct from other lower Columbia collections.

Kalama coastal cutthroat are native and are sustained by wild production.

STOCK STATUS

The status of Kalama coastal cutthroat is Depressed based on declining numbers of wild adults at the Kalama Falls fishway, smolt trapping data and Columbia River sport catch data. Overall, the quality of the data used to make this assessment is good.

Wild adult counts at the Kalama Falls fishway trap ranged from eight to 53 adults per year from 1976 to 1986, with an average of 25 adults per year. From 1987 through 1994, adults counts ranged from two to nine fish per year with an average of five adults per year (Leider 1997).

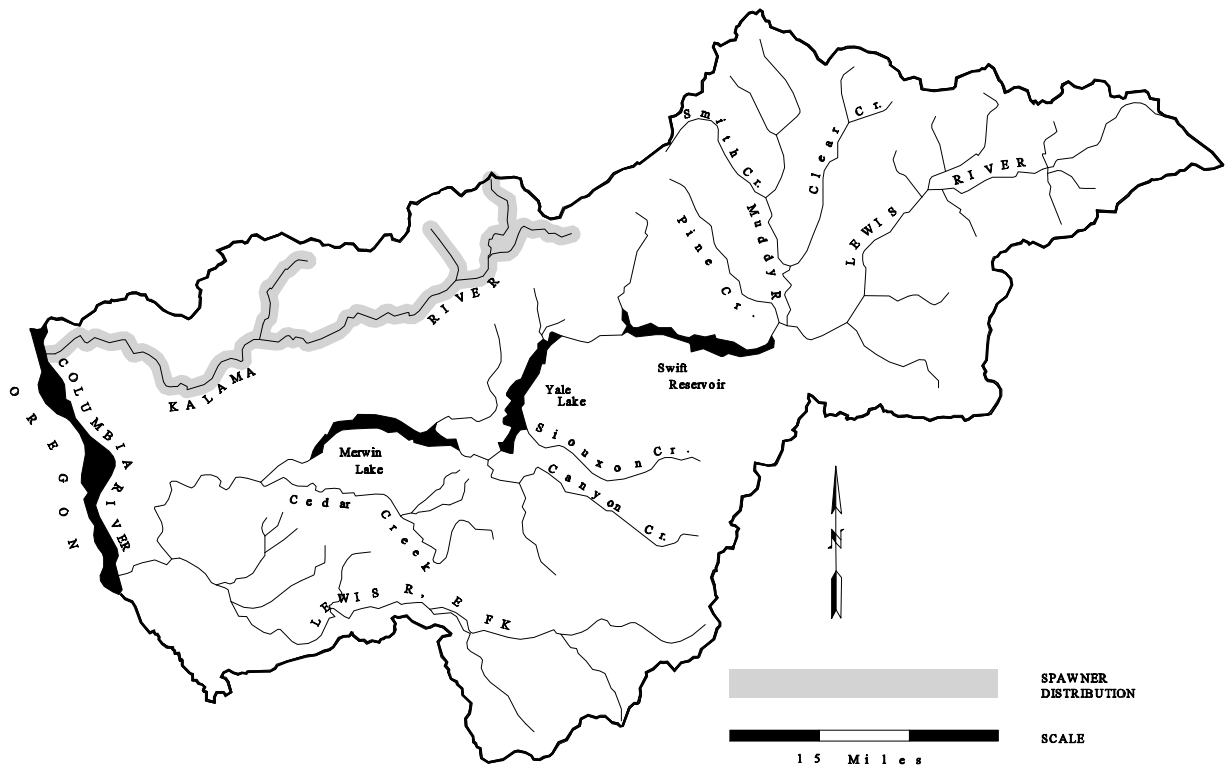
The Kalama Research Team has collected smolt data since 1978. The estimates for the number of smolts produced above Kalama Falls from 1978 through 1984 ranged from 163 to 16,229 with yearly average of 7,737. From 1992 through 1994, the number of smolts ranged from 106 to 1,667 with a yearly average of 749 smolts.

Catch data from the Columbia River sport creel census also shows a decline in anadromous cutthroat abundance (Leider 1997). The average yearly catch of cutthroat by Washington and Oregon anglers from 1969 to 1985 was 4,985 fish. From 1886 through 1993 the yearly average was 521 fish with a low of 96 in 1992 (Dan Rawding, WDFW, personal communication).

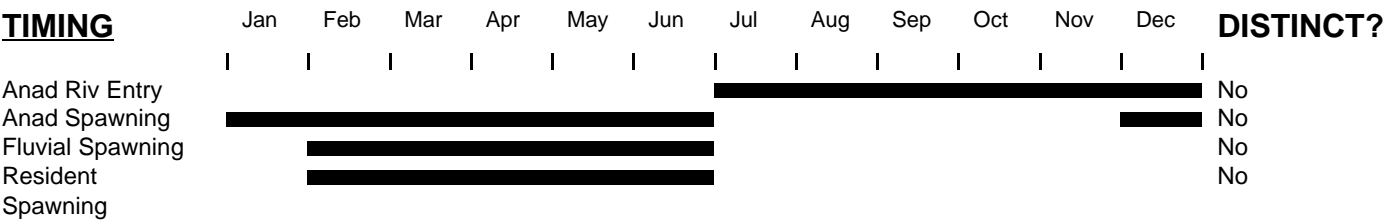
STOCK DEFINITION PROFILE for Kalama Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - YES



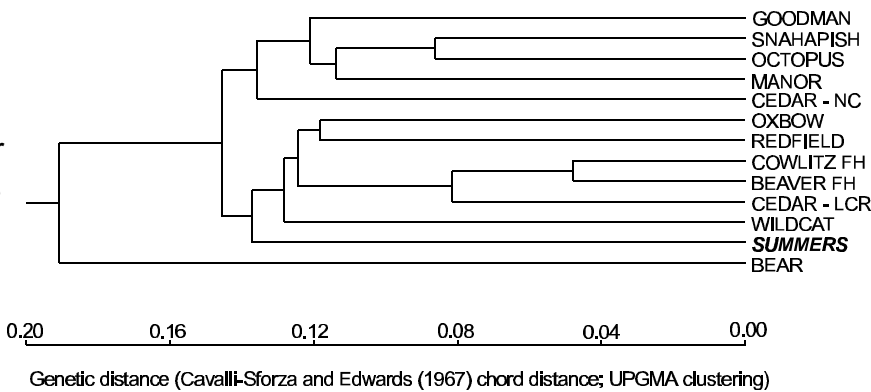
TIMING



BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

GENETICS - The Summers Cr. collection (N=60), made in 1996, was significantly different from all other lower Columbia collections (33 allozyme-locus G-tests; $P<0.001$).



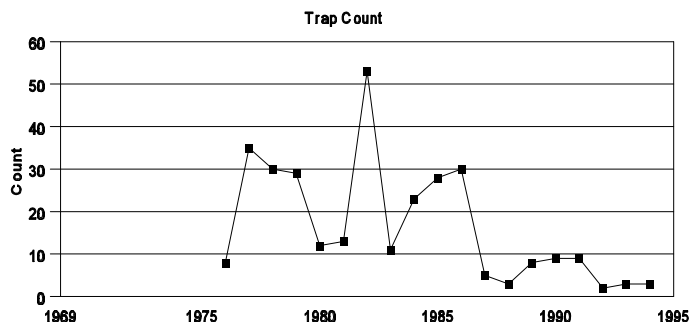
STOCK STATUS PROFILE for Kalama Coastal Cutthroat

STOCK ASSESSMENT

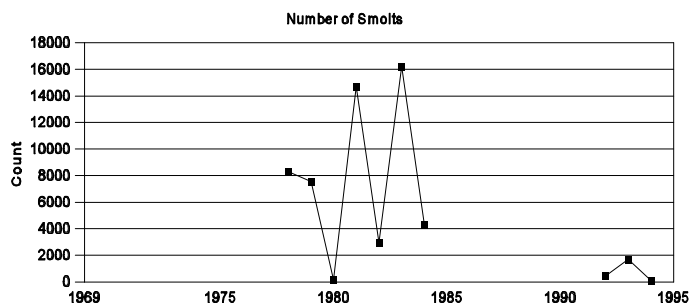
DATA QUALITY -----> Good

Return Years	RUNSIZE Trap count	JUVENILE Smolts	HARVEST Sport	
1969			7,756	
1970			13,617	
1971			8,107	
1972			4,342	
1973			1,467	
1974			2,709	
1975			3,911	
1976	8		5,023	
1977	35		1,405	
1978	30	8,296	4,238	
1979	29	7,536	3,474	
1980	12	163	3,822	
1981	13	14,704	5,336	
1982	53	2,943	2,239	
1983	11	16,229	7,379	
1984	23	4,286	3,560	
1985	28		3,355	
1986	30		503	
1987	5		500	
1988	3		683	
1989	8		826	
1990	9		948	
1991	9		497	
1992	2	445	96	
1993	3	1,697	114	
1994	3	106		
1995				

Runsize



Juvenile



AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Depressed

Screening Criteria

Short-term severe decline

Quantitative data for fluvial and resident fish are not available, but the fish have been affected by severe habitat degradation in the Kalama drainage.

FACTORS AFFECTING PRODUCTION

Habitat--The watershed is managed for timber harvest and has been heavily logged. Approximately 96% of the Kalama River watershed is owned and managed by private timber companies. The Washington Department of Natural Resources manages a few sections scattered throughout the drainage, and the US Forest Service has limited land ownership in Kalama River headwaters. Most of the watershed was logged from the 1960s through the early 1980s. Current timber harvest is minimal in comparison. Past logging has caused dramatic and deleterious changes in riparian cover, pool habitat, temperature, sedimentation and flow regimes.

Increased urbanization of the riparian zone along the mainstem Kalama has also degraded fish habitat. Private home construction and associated bank stabilization projects along the river have reduced riparian vegetation. Contamination by septic systems, fertilizers, herbicides, pesticides and other sources of pollution is a concern, as is excessive water withdrawal from the river.

Harvest Management--Wild cutthroat release regulations are in effect from the mouth of the Kalama River upstream to the 6420 Road (near Arnold Creek) just below Kalama Falls. There is a two-trout daily limit with 14-inch minimum size limit. The lower end of the mainstem is open year-round below Summers Creek. Above the confluence of Summers Creek and Kalama River and up to the 6420 Road the river is open June 1 through March 31 with the 14-inch minimum size limit intended to protect resident fish, juveniles and outmigrating smolts. The fishing season for the river above Kalama Falls and tributaries begins June 1 and runs through October 31, with a two-trout daily limit and eight-inch minimum size limit intended to protect resident fish, juveniles and outmigrating smolts. Cutthroat are not required to be released in the upper river.

Hatchery--No anadromous cutthroat releases have been made into the Kalama in at least the last decade. The Kalama Falls and Fallert Creek hatcheries are located on the Kalama River. They rear and release fall chinook (3.5 million), spring chinook (500,000), coho (1.2 million) and summer and winter steelhead. Past annual release levels of summer and winter steelhead have been 30,000 and 80,000 fish respectively. Planned releases are for 90,000 winter steelhead and 90,000 summer steelhead. Interactions between wild coastal cutthroat and other hatchery-origin salmonids have not been examined.

LOWER COLUMBIA — LEWIS COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Lewis coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds.

Anadromous, fluvial, adfluvial and resident forms of coastal cutthroat reside in the Lewis watershed. Anadromous coastal cutthroat are found in the North Fork Lewis River and its tributaries up to Merwin Dam, which is a blockage to upstream passage. In the East Fork Lewis River anadromous fish are believed to migrate up to Lucia Falls in most years. Passage above the falls is possible when severe flood conditions exist. Anadromous fish are found in many tributaries below Lucia Falls. Fluvial and resident coastal cutthroat are found throughout the watershed, including areas of anadromy. Adfluvial fish have been observed in the Merwin, Yale and Swift reservoirs above Merwin Dam on the North Fork Lewis River. All of these reservoirs have many inlet tributaries where resident fish are found. On the East Fork Lewis River resident cutthroat are found throughout the watershed, especially above Lucia Falls.

Anadromous coastal cutthroat enter the river from July through December and spawn from December through June. Fluvial, adfluvial and resident fish spawn from February through June.

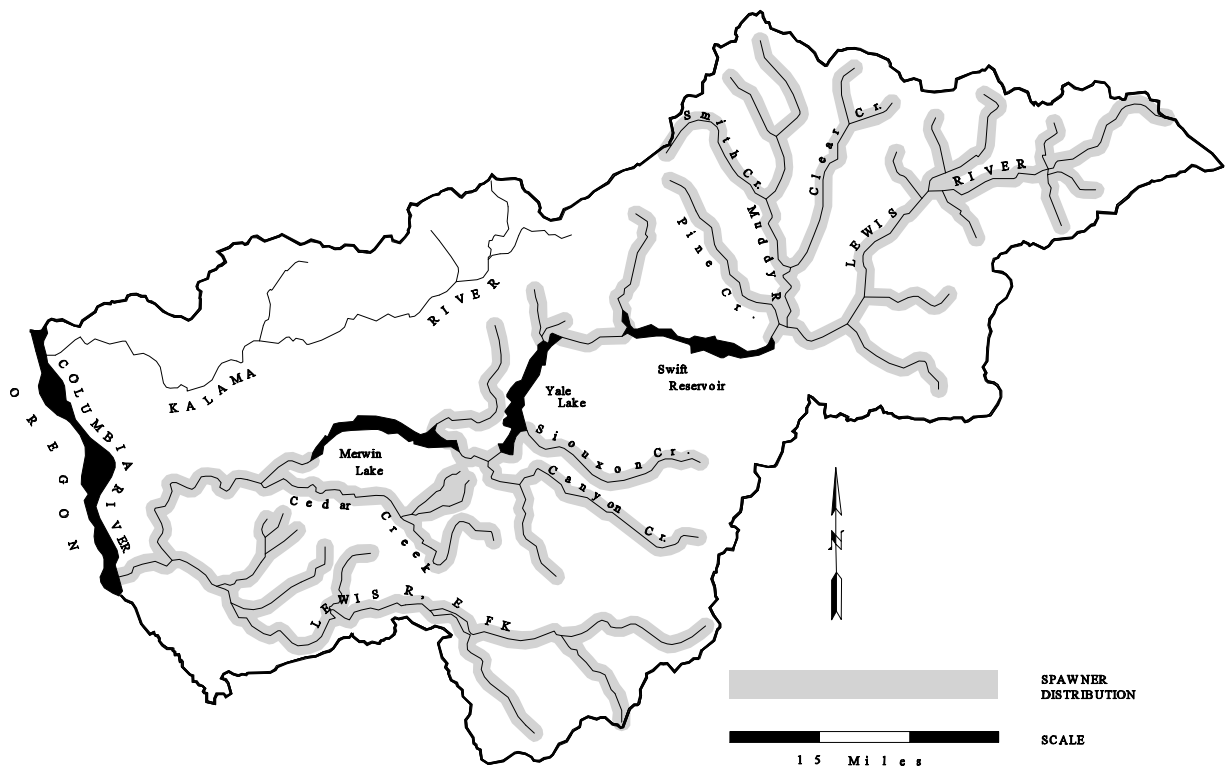
In a recent genetic analysis this complex was represented by one collection (Cedar Creek), which was found to be genetically distinct from other lower Columbia coastal cutthroat collections.

Hatchery-origin anadromous cutthroat are released as smolts into the mainstem North Fork Lewis annually. Native fish inhabit many areas that are geographically isolated from sites where hatchery releases have taken place. Native cutthroat may also be isolated due to different spawn timing from hatchery cutthroat which have been released into the watershed. Almost all resident cutthroat production is from wild production. Blue Lake, which drains into the upper North Fork Lewis River above Swift Reservoir, contains hatchery-origin Twin Lakes westslope cutthroat, which can successfully reproduce when favorable conditions exist. Although interactions between wild and hatchery-origin coastal cutthroat in the Lewis River system have not been examined, local WDFW staff believe that very few, if any, genetic interactions have occurred between native cutthroat populations and the small number of resident hatchery cutthroat which have been released in the watershed. Consequently, the Lewis coastal cutthroat stock is considered native with wild production.

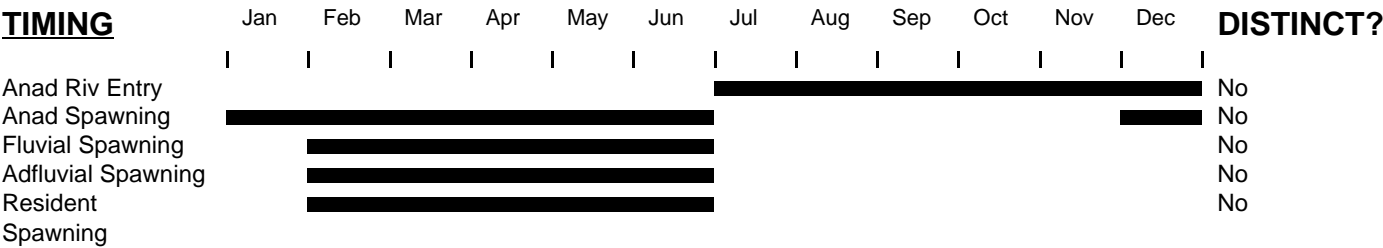
STOCK DEFINITION PROFILE for Lewis Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - YES



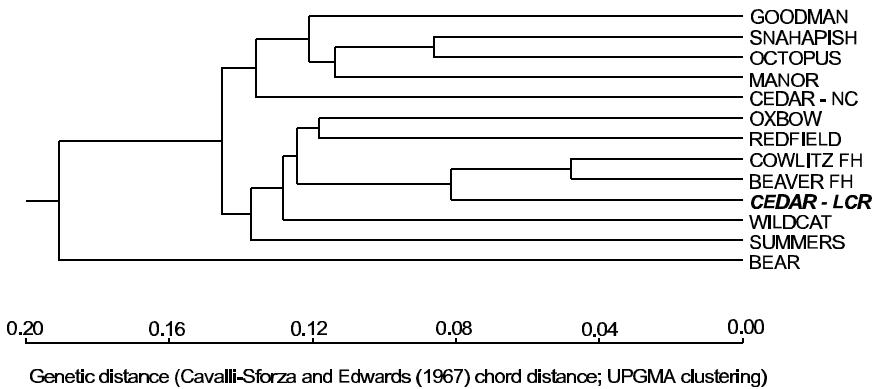
TIMING



BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

GENETICS - The Cedar Cr. collection, made in 1996, (N=51) was significantly different from all other lower Columbia collections (33 allozyme-locus G-tests; $P<0.001$).



STOCK STATUS PROFILE for Lewis Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> No Data

Return Years				
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AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Unknown

Screening Criteria

STOCK STATUS

The status of Lewis coastal cutthroat is Unknown because there is insufficient quantitative information to identify a trend in abundance or survival. However, given habitat conditions and declining trends in sport catches in the Columbia River, to which Lewis anadromous cutthroat contribute, it is likely that the stocks are Depressed.

FACTORS AFFECTING PRODUCTION

Habitat--Freshwater habitat continues to decline through human encroachment into the watershed. Three mainstem dams and three fish hatcheries have been built on the North Fork Lewis River. The construction of Merwin Dam in 1929 probably destroyed a significant portion of cutthroat spawning waters, and as a result, runs are below historic levels. The upper North Fork watershed has been under intensive timber management with clearcutting and road construction. These activities have caused changes in riparian cover, pool habitat, temperature, sedimentation and flow regimes.

The eruption of Mt. St. Helens in 1980 caused severe damage to many of the tributaries on the north side of the watershed.

The East Fork Lewis River is experiencing rapid human growth throughout most of the watershed. In addition to housing development, activities such as gravel mining, mineral mining, water withdrawal, and logging occur in the system.

Harvest Management--Sportfishing regulations are in place to protect both resident and anadromous cutthroat throughout the watershed. On the North Fork Lewis River mainstem below Merwin Dam, regulations call for a two-fish daily limit with a 12-inch minimum size limit intended to permit anadromous females to spawn at least once. Wild fish must be released. The same regulations apply to the mainstem Lewis River. In the reservoirs above Merwin Dam there is a five-trout daily limit with no minimum size limit. Merwin and Yale reservoirs are open year-round. Swift Reservoir is open from the end of April through October. Cedar Creek, a tributary of the North Fork Lewis, is open from June 1 through March 15 with two-fish daily limit and a 12-inch minimum size limit. On the East Fork Lewis mainstem there is also a two-fish daily limit with a 12-inch minimum size limit. There are no commercial fisheries on cutthroat trout in the Lewis River system.

Hatchery--Currently about 25,000 anadromous cutthroat raised at Merwin Hatchery are released as smolts into the mainstem North Fork Lewis River annually. No hatchery-origin anadromous cutthroat are released into the East Fork Lewis River. There are no releases of resident coastal cutthroat in the Lewis River watershed. Twin Lakes westslope cutthroat are released into Blue Lake and into lakes in the Indian Heaven Wilderness. Interactions between wild and hatchery-origin anadromous cutthroat in the Lewis River system have not been examined.

The Lewis River, Merwin and Speelyai hatcheries are located on the North Fork Lewis River. In addition to anadromous coastal cutthroat, the hatcheries rear and release 900,000 spring chinook, about three million coho, steelhead and resident rainbow trout. Coho are released both into the river and into Merwin Reservoir to provide a resident fishery. Kokanee were introduced above Merwin Dam in the 1950s and are currently self-sustaining in Yale and Merwin reservoirs although annual releases of about 93,000 kokanee from Speelyai still occur. Rainbow fingerlings (about 500,000 annually) are released into Swift Reservoir. Annual steelhead smolt releases include both winter fish (100,000) and summer fish (230,100). Interactions between these species and native cutthroat have not been examined.

LOWER COLUMBIA — SALMON CREEK COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Salmon Creek coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds. Salmon Creek is an independent tributary which enters the Columbia River upstream from the mouth of the Lewis River.

Both anadromous and resident forms of cutthroat trout are present in Salmon Creek. Anadromous coastal cutthroat enter the river from July through December and spawn from December through June. Resident fish spawn from February through June.

Hatchery-origin anadromous cutthroat have been released into Salmon Creek at least since 1952. The extent of hybridization, if any, between them and native cutthroat is unknown. No genetic sampling has been conducted on Salmon Creek cutthroat.

Salmon Creek coastal cutthroat are considered native and are sustained by composite production.

STOCK STATUS

The status of Salmon Creek coastal cutthroat is Unknown because there is insufficient quantitative information to identify a trend in abundance or survival. However, given the condition of the habitat and declining trends in Columbia River sport catches, to which anadromous Salmon Creek cutthroat contribute, it is likely that the stock complex is Depressed.

FACTORS AFFECTING PRODUCTION

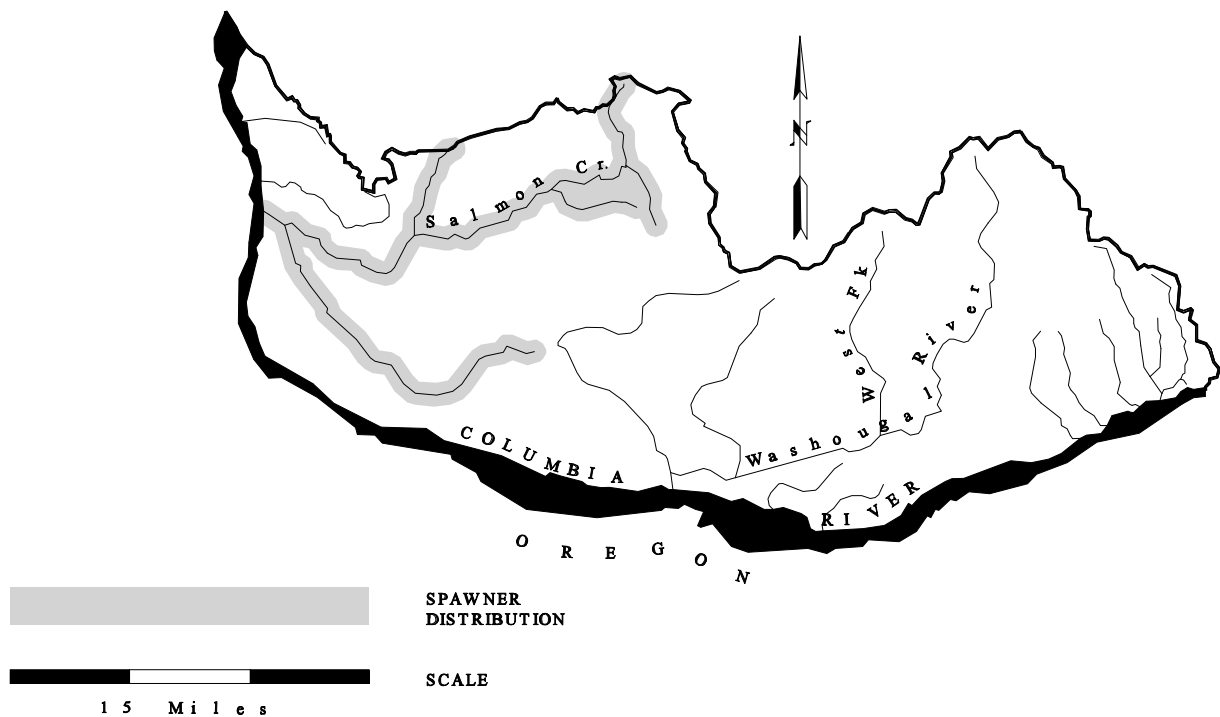
Habitat--Freshwater habitat continues to change through human encroachment throughout this small watershed. Barriers to movement such as improperly placed culverts and damming streams, water withdrawal, contamination from septic systems, fertilizers, herbicides, pesticides and other sources of pollution have continued to be problems. Road and residential development have created flashier runoff and winter flooding which causes erosion and low flow and high water temperature in the summer. All of these factors have combined to reduce the ability of Salmon Creek to support wild fish production.

Harvest Management--There is a June 1 through March 15 recreational fishing season on the mainstem Salmon Creek with a two-trout daily limit and a 12-inch minimum size limit. All wild cutthroat must be released. Tributaries and the upper mainstem are open

STOCK DEFINITION PROFILE for Salmon Creek Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - YES



TIMING

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													No
Anad Spawning													No
Resident Spawning													No

BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

STOCK STATUS PROFILE for Salmon Creek Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> No Data

Return Years				
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AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Composite

Stock Distinction

Distribution

Stock Status

Unknown

Screening Criteria

from June 1 through October 31 with a two-fish trout daily limit, an eight-inch minimum size limit to protect resident fish, and no wild cutthroat release.

Hatchery--Although there are no fish hatcheries located in the Salmon Creek drainage, hatchery-origin anadromous coastal cutthroat, steelhead and coho are released into Salmon Creek. Presently 15,000 winter steelhead smolts, 145,000 coho fry, and 12,000 cutthroat smolts are released each year into this system. Interactions between wild cutthroat and hatchery-origin fish have not been examined.

LOWER COLUMBIA — WASHOUGAL COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

Washougal coastal cutthroat have been identified as a distinct stock complex based on the geographic distribution of their spawning grounds.

Anadromous, fluvial, adfluvial and resident forms of cutthroat trout inhabit the Washougal watershed. Anadromous coastal cutthroat are found in the mainstem and most of its tributaries up to Dougan Falls. This waterfall is believed to be a barrier in most years to adult passage. Fluvial and resident coastal cutthroat are found throughout the watershed in the upper mainstem and tributaries such as Lacamas Creek, the upper North Fork Washougal, upper Little Washougal River, Canyon Creek, Timber Creek and Prospector Creek. Adfluvial fish are found in Lacamas Lake.

Anadromous coastal cutthroat enter the river from July through December and spawn from January through June. Fluvial, adfluvial and resident fish spawn from February through June.

A hatchery broodstock program for anadromous cutthroat is located at Skamania Hatchery on the North Fork Washougal River. Washougal coastal cutthroat are considered native with composite production since production of these fish occurs at the hatchery as well as in streams in the watershed.

STOCK STATUS

The status of Washougal coastal cutthroat is Unknown because there is insufficient quantitative information to identify a trend in abundance or survival. However, discussions with local residents who have fished in the watershed for many years coupled with the loss of habitat to urbanization suggest that this stock may be Depressed. Hatchery-origin anadromous cutthroat in the Washougal rebounded in 1995-96.

FACTORS AFFECTING PRODUCTION

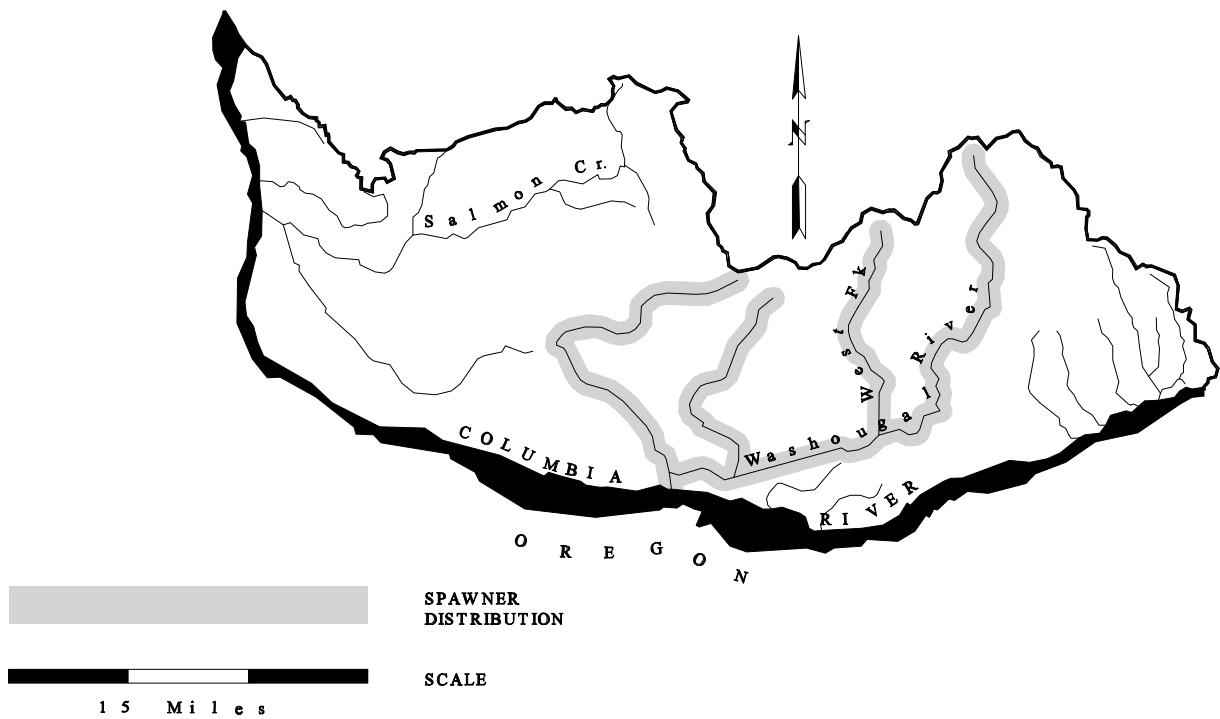
Habitat--Freshwater habitat continues to decline through human encroachment throughout the watershed. Logging, farming, residential construction, road building, barriers to fish movement, water withdrawal and pollution are occurring in the watershed.

Harvest Management--The mainstem Washougal River recreational fishing season is June 1 through March 15, with a two-trout daily limit and a 12-inch minimum size limit. Wild cutthroat must be released. The mainstem is closed from the Salmon Falls bridge

STOCK DEFINITION PROFILE for Washougal Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - YES



<u>TIMING</u>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													No
Anad Spawning	████████████████████											████████	No
Fluvial Spawning		████████████████											
Adfluvial Spawning		████████████████											
Resident Spawning		████████████████											No

BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

STOCK STATUS PROFILE for Washougal Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> No Data

Return Years				
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AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Composite

Stock Distinction

Distribution

Stock Status

Unknown

Screening Criteria

upstream. The same regulations apply to the North Fork Washougal River. Tributary regulations include a June 1 through October 31 open season with a two-trout daily limit and an eight-inch minimum size limit to protect resident cutthroat.

Hatchery--Two fish hatcheries operate in the Washougal River watershed. Washougal Salmon Hatchery is located on the mainstem above Salmon Falls and rears and releases fall chinook, coho, and winter and summer steelhead. Skamania Hatchery is located on the lower end of the North Fork Washougal River. A hatchery anadromous cutthroat broodstock program is maintained at this facility with 29,000 cutthroat released annually into the Washougal. Approximately 500,000 fall chinook, 600,000 coho, 80,000 winter steelhead and 100,000 summer steelhead are released into the Washougal system annually. Interactions between wild coastal cutthroat and hatchery-origin salmonids have not been examined.

LOWER COLUMBIA — SMALL TRIBS BETWEEN LEWIS RIVER AND BONNEVILLE DAM COASTAL CUTTHROAT

STOCK DEFINITION AND ORIGIN

The small tributaries coastal cutthroat stock complex has been identified as distinct based on the geographic distribution of its spawning grounds. The streams included in this stock complex include Whipple Creek, Burnt Bridge Creek, Gee Creek, Gibbons Creek, Lawton Creek, Duncan Creek, Woodward Creek, Hardy Creek and Hamilton Creek. Fish in these streams have been grouped into one stock complex based on the proximity of the streams and their habitat similarities. The number of genetically distinct stocks within this stock complex and the relationship of this complex to other stocks and stock complexes are unknown. Genetic sampling and analysis are needed to make these determinations.

Both anadromous and resident cutthroat inhabit these small watersheds. Anadromous cutthroat enter the streams from September through December and spawn from December through June. Resident fish spawn from February through June.

Hamilton Creek is the only stream to receive releases of hatchery-origin anadromous cutthroat. The extent of hybridization between wild and hatchery cutthroat is unknown. Overall, this stock is considered native and is sustained by natural production.

STOCK STATUS

The status of the small tributaries stock is Unknown because there is insufficient quantitative information to identify a trend in abundance or survival. However based on trend data in the Kalama River, declining sport catches in the Columbia River and habitat problems in several streams which limit their ability to produce fish, stock status is likely to be Critical, especially in Whipple, Burnt Bridge, Duncan and Lawton creeks and Depressed in Hamilton, Woodward, Hardy, Gee, and Gibbons creeks. The streams with the most depleted cutthroat populations have severe habitat problems which limit their ability to produce fish. Problems include no fish passage for cutthroat trout over a dam at the mouth of Duncan Creek and severe water quality and quantity problems on Whipple and Burnt Bridge creeks.

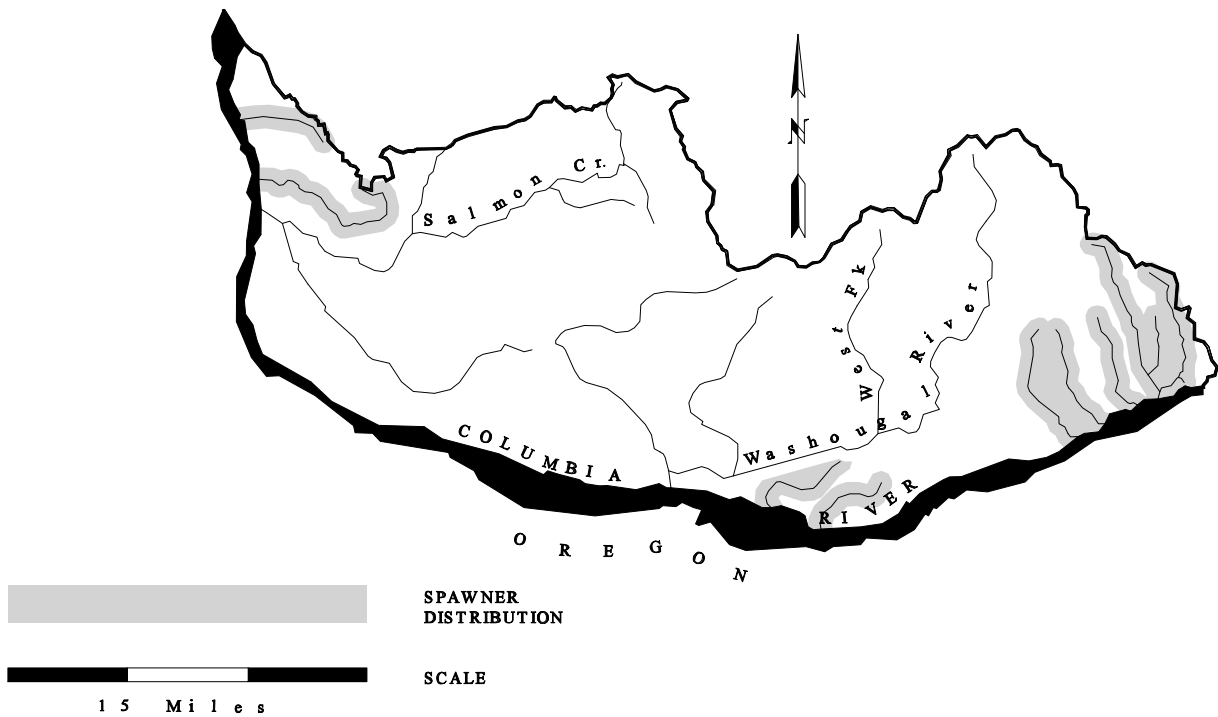
FACTORS AFFECTING PRODUCTION

Habitat--Freshwater habitat throughout the area continues to decline through human encroachment. The land around streams such as Whipple and Burnt Bridge creeks has been urbanized, and the streams suffer from water pollution from chemical runoff from pesticides, herbicides, faulty septic systems, water withdrawals for backyard irrigation, and impassible culverts from road building.

STOCK DEFINITION PROFILE for Small Tribes between Lewis River and Bonneville Dam Coastal Cutthroat

SPAWNER DISTRIBUTION

DISTINCT? - UNKNOWN



TIMING

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DISTINCT?
Anad Riv Entry													Yes
Anad Spawning													No
Resident													No
Spawning													No

BIOLOGICAL CHARACTERISTICS

DISTINCT? - Unknown

STOCK STATUS PROFILE for Small Tributaries between Lewis River and Bonneville Dam Coastal Cutthroat

STOCK ASSESSMENT

DATA QUALITY -----> No Data

Return Years				
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AVERAGE RUNSIZE DISTRIBUTION

Data not available.

STOCK SUMMARY

Stock Origin

Native

Production Type

Wild

Stock Distinction

Distribution

Stock Status

Unknown

Screening Criteria

Road and residential construction have caused flashier runoff and winter flooding which causes erosion and sedimentation, and low flow and high water temperatures during the summer months. All of these activities have combined to reduce the ability of these creeks to support fish production.

Harvest Management--Angling in most of these streams is regulated by statewide stream regulations which provide for a June 1 through October 31 season with a two-trout daily limit and an eight-inch minimum size limit to protect resident fish. Hamilton Creek has a June 1 through March 15 season with a two-trout daily limit and a 12-inch minimum size limit, and a requirement to release wild cutthroat. All hatchery-origin anadromous cutthroat released into Hamilton Creek are marked with adipose clips so anglers can distinguish them from wild fish.

Hatchery--There are no hatcheries on these streams. However, Hamilton Creek receives about 6,000 winter steelhead smolts annually. Interactions between native, wild coastal cutthroat in these streams and other hatchery-origin salmonids have not been examined.

LOWER COLUMBIA — TRIBUTARIES ABOVE BONNEVILLE DAM **COASTAL CUTTHROAT**

Historical information suggests that anadromous coastal cutthroat trout utilized the tributaries above Bonneville prior to the construction of the dam, going up to at least the Wind and Klickitat rivers. In addition, resident and fluvial forms probably exist in these and other tributaries. Resident forms apparently are found in Spring Creek on the White Salmon and Rock Creek (Dan Rawding, WDFW, personal communication). Anadromous cutthroat trout have also been landed at the Powerpole facility across the river from the White Salmon in the Hood River Basin, and one was apparently captured on the Wind in 1997 (Dan Rawding, WDFW, personal communication).

Although there is presently no effort to enumerate coastal cutthroat trout above Bonneville Dam (nor is there any documented historic information), coastal cutthroat are occasionally encountered in the course of work on other species. This note is presented in this SaSI to document coastal cutthroat presence for future consideration.

